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GUIDES AND PROCEDURES

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CHAPTER 3

ROADS, GROUNDS, REFUSE, SHOPS, AND EQUIPMENT

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Section I. AIRFIELD PAVEMENTS

3.1. General

Keeping runways and landing fields in condition for safe use at all times will take priority over all other post engineer maintenance at AAF stations. Runway pavements should be inspected daily and immediate repairs made on areas showing any scaling, raveling, checking, or settling.

3.2. Extensions and Additions

When extensions or additions to airfield pavements are to be *permanent* in nature, design analysis for the improvements will be submitted to OCE. Applicable design criteria will be followed, regardless of funds used for the work. When repairs and utilities funds are to be used, the commanding general of the air force or AAF command will decide whether the post engineer will do the work. If the post engineer is not able to perform the proposed work, assistance of the appropriate division engineer will be requested.

3.3. Patching

Load capacity of pavement patches should not materially exceed the *designed* strength of the original construction. Patching materials should be similar in character to materials originally used in the pavement.

3.4. Joints in Concrete Pavements

Because the poured bituminous joint fillers used in building many concrete pavements perform unsatisfactorily, resealing or completely replacing poured joints will be necessary in a number of cases. However, the need for removing and replacing any large amount of filler should be investigated carefully before approval; whenever possible, less expensive alternate methods should be used. Using light grades of bituminous material to reseal existing joints instead of replacing them should be considered even if resealing would have to be repeated yearly. The expected period of Army use and the possible deteriorating effects of slight leakage into the base and subgrade should affect the decision.

3.5. Cleaning Airfield Pavements

To prevent damage to aircraft tires by stones, metal scraps, and other debris, airfield pavements must be cleaned and policed frequently.

3.6. Airfield Marking

a. RUNWAYS AND TAXIWAYS. (1) *Funds.* Repairs and utilities funds can be used for all initial marking and remarking of runways and taxiways, unless the work is part of construction or reconstruction of airfield pavements for which construction funds are used. Requests will be processed in accordance with current instructions for repairs and utilities projects; however, the commanding general of the air force or AAF command will first decide which airfields need numbering and marking. All costs in connection with initial marking and remarking of pavements will be charged to appropriate direct-cost accounts; no part will be charged as new work.

(2) *Performance.* Because this work must be closely coordinated with flying activities and pavement-maintenance operations, as much of it as possible should be done by purchase and hire so the post engineer can supervise it closely.

(3) *Numerals and symbols.* New numerals, bars under numerals, and length symbols will not be placed until the old numerals need repainting. Then, new numerals and length symbols will be painted to comply with current standards. Obsolete pavement markings which are not masked out by the new stripings, numerals, and symbols should be obliter-

ated only enough to eliminate confusion or conflict with the revised marking pattern.

(4) *Omission of standard features.* If the commanding general of an air force or AAF command does not think complete field marking is necessary for flying operations, standard numerals, symbols, stripings, or delineators may be omitted. Substituting nonstandard numerals, symbols, stripings, or delineators is not authorized. The commanding general of air force or AAF command will choose between alternate types of taxiway delineators, such as reflector disk as against applied reflective material.

(5) *Apron marking.* Taxiway markings may be continued through or along one edge of an apron if the commanding general of the air force or AAF command concerned considers it necessary. However, marking should not be used merely to indicate aprons.

b. HAZARDS. Any hazardous condition of pavements or other areas used by aircraft will be plainly marked.

(1) *Small areas.* Small holes, soft spots, etc., on the usable portion of airports will be marked with yellow flags or yellow pyramids by day and with red lights by night to warn incoming pilots that those spots are unsafe for landing.

(2) *Large areas.* When relatively large areas are unsafe for landing, they will be outlined with yellow flags by day and with red lights by night. A large cross will be set in the approximate center of the area, using yellow flags or strips of yellow cloth by day and red lights at night.

(3) *Closed runways.* When a well-defined runway is closed, a large cross of yellow flags or yellow strips of cloth will be placed at each end during daylight hours. At night, red lights in the form of a cross will be placed at each end of the runway, making certain that enough lights are used for the cross to be clearly distinguishable.

Note. Crosses must be large enough to warn visiting pilots that the area or runway is unsafe. A large number of individual markers will not be used, as they would make it impossible for a pilot to determine precisely which area is to be used and which avoided.

3.7. Failures

Summary reports will be prepared for each *major* failure of pavements at airfields constructed by the Corps of Engineers for use by AAF. They will not be prepared for *minor* pavement-surface failures such as raveling or spalling, or where resealing only is required. Reports will also be submitted if the pavement has shown signs of severe overstress though actual failure has not occurred. The division engineer concerned will be responsible for arranging preparation of these reports and for assembling and submitting two copies to OCE and one copy to the Waterways Experiment Station, Vicksburg, Mississippi.

3.8. Leased Airdromes

a. MAINTENANCE. The extent of War Department responsibility for maintenance and repair of flying fields and facilities at leased airdromes depends on terms of the lease. Work for which the War Department is responsible is chargeable to applicable repairs and utilities funds, and may be done by a post engineer or by contract citing these funds. At airfields used concurrently by the Government, the lessor, and other tenants, maintenance and repair costs may be shared by the parties involved on a proportional basis. However, for greater safety and efficiency, the Government should be responsible for *performing* the work on *all* leased property.

b. CERTIFICATES OF NECESSITY. Repair, alteration, or improvement of runways, taxiways, aprons and similar facilities does not require a certificate of necessity in accordance with Public Law 530, 77th Congress. (See par. 2.33.) Limitations of the Economy Act apply specifically to leased buildings, structures or parts of buildings and structures.

Section II. ROADS AND WALKS

3.9. Off-reservation Roads, Streets, and Highways

a. PUBLIC ROADS ADMINISTRATION. Normally, on certification by the Secretary of War, the Public Roads Administration will maintain and make essential improvements and repairs to access roads to posts, camps, stations, and leased or purchased auxiliary fields, ranges, and training areas, whether or not they are State, county, or municipal roads. (See Defense Highway Act of 1941, Pub. Law 77th Congress, as amended.)

b. WAR DEPARTMENT. War Department funds can be used to repair public roads and streets

emergencies only, to insure safe passage of military traffic; only *essential* repairs can be made.

c. CLAIMS. Claims arising from damage caused by military vehicles on State, county, or municipal roads may be handled under procedures outlined in AR 25-20 or 25-25, or through the Public Roads Administration in accordance with section 10, Public Law 295, 77th Congress, as amended.

3.10. Public Roads in Military Reservations

a. ROADS NOT CLOSED OR CONTROLLED. Public roads which are in military reservations and which have not been closed or on which public traffic is not controlled by the post commander will be improved, repaired, or maintained by the responsible local unit of government; or the Public Roads Administration can be requested to finance the work as an access-road project in accordance with existing access-road procedure.

b. CLOSED OR CONTROLLED ROADS. Roads in military reservations can be improved or repaired with repairs and utilities funds if the post commander has closed or controlled public traffic on them, and if the War Department acquires a real-property interest in them. (See AR 100-61.)

c. EMERGENCY WORK. Repairs and utilities funds can be used for any essential emergent repairs to public roads in military reservations if the repairs are needed to insure safe passage of military traffic.

3.11 Emergency Assistance to State Highway Departments

a. WHEN PERMITTED. To prevent serious interruption of traffic on principal through highways and on access roads to military establishments and defense industries, commanding generals of service commands can lend to State Highway Departments for highway maintenance and snow removal any equipment, repair parts, and maintenance supplies under their control which can be spared temporarily from other less urgent military uses. Since such equipment is extremely critical and, in general, in constant use for direct military purposes, assistance must be limited to emergency situations involving war-connected needs. Therefore, this aid will be given only when the appropriate district enginer of the Public Roads Administration certifies to the commanding general of the service command that an emergency exists, and the commanding general of the service command determines that the military interest is directly affected by the emergency.

b. PROCEDURES. (1) *Equipment.* Service commands will lend equipment to State Highway Commissions on memorandum receipt. Commissions will be responsible for operating and maintaining the equipment and for returning it in substantially the condition in which it was received.

(2) *Repair parts and maintenance supplies.* Repair parts and maintenance supplies for equipment loaned to State Highway Commissions and for other equipment operated by the commissions will be loaned on memorandum receipt when repayment is to be in kind; if monetary repayment is to be made, parts and supplies will be sold to State Highway Commissions at not less than cost to the Government. If the commanding general of a service command has no equipment and spare parts available, the appropriate division engineer may be asked to make available additional supplies and equipment under his control.

3.12. Standards of Maintenance

a. ROADS. Normally, temporary type construction roads will require constant maintenance. Since temporary roads can, by intensive effort, be kept in usable condition at all times, their replacement with permanent type construction is against established policy.

b. WALKS. To reduce tracking of mud into buildings, access walks from paved streets or sidewalks to buildings may be resurfaced with crushed stone, and timber footbridges may be built across deep ditches. Temporary walks should not be given bituminous surface treatment unless available aggregates require additional binder for stability and economical maintenance.

3.13. Leased Facilities

The certificate required by Public Law 530, 77th Congress (par. 2.33) is not needed for repair, alteration, or improvement of pavements in leased areas. Limitations of the Economy Act apply specifically to leased buildings and structures or parts of buildings and structures.

3.14. Private Cemeteries Within Military Reservations

For policy on maintaining roads and walks at private cemeteries within military reservations, see paragraph 3.41*b*.

3.15. Manufacturing Plants

Repairs and utilities responsibility for maintaining roads, walks, and parking areas at industrial sections of Government-owned and operated Chemical War-

fare Service and Ordnance Department armories, arsenals, and proving grounds includes sweeping, sprinkling, cleaning, snow removal, and repair. The operating service is responsible for maintenance at proof facilities. For a list of facilities to which this policy applies, see paragraph 1.9.

Section III. PAVING MATERIALS

3.16. Asphalt and Road Oils

The following directives issued by the Petroleum Administrator for War restrict the use of asphalt for paving purposes:

a. *PETROLEUM DIRECTIVE No. 72. Petroleum Directive No. 72, 9 September 1943, prohibits the delivery, acceptance of delivery, and use of road oil as a paving material or dust palliative on roads or other surfaces. Road oil is defined in the directive as crude petroleum or any of its derivatives which, on distillation to 680° F., will yield a residue having a penetration greater than 350 at 77°, 100 grams, 5 seconds; it does not include medium-curing cut-back asphalt or flux oil which is used exclusively for fluxing natural rock or native asphalt or which is mixed with powdered asphalt to prepare plant-mixed paving mixtures. Individual requests for release of road oils will be sent to the Petroleum Administration (par. (c) of the directive); they will include a full description of the intended use of the material and specific reasons why less critical products or alternate methods cannot be satisfactorily employed.

b. PETROLEUM DIRECTIVE No. 66. Petroleum Directive No. 66, as amended 22 May 1943, prohibits the manufacture of crack filler, joint filler, cold patch, lump or powdered asphalt, and zone-marking paint when these products are to be transported from a refinery by tanker, barge, tank car, tank truck, or tank trailer; it also limits the grades of asphalt which may be used for paving or for dust-palliative purposes.

3.17. Tests and Development Work

To facilitate and coordinate all special investigations, tests, research, and development work on bituminous materials and flexible pavement design, a Flexible Pavement Laboratory has been established as a branch of the Embankment, Foundation, and Pavement Division, U. S. Waterways Experiment Station, Vicksburg, Mississippi. A Rigid Pavement Laboratory has been established in the Cincinnati Testing Laboratory, Ohio River Division, Mariemont, Ohio, to do similar work on design and construction of rigid type pavements. The laboratories will be equipped primarily to perform the functions outlined above; on request, they will also do routine testing for post engineers on a reimbursement basis

3.18. Asphalt Procurement

The Corps of Engineers is responsible for specifications, determining requirements, providing funds purchase, inspection, and storage and issue of soli asphalts, cut-backs, and emulsions for paving purposes. (See WD Procurement Reg. No. 603.)

Section IV. RAILROADS

3.19. Maintenance Responsibility

a. TRANSPORTATION CORPS. The Transportation Corps is responsible for operating and maintaining all railway equipment, for maintenance-of-way of all military railways, and for maintenance-of-way of utility railways at designated posts or at areas under direct control of tactical commanders where units of the Military Railway Service have been specifically assigned for the purpose.

b. CORPS OF ENGINEERS. The Corps of Engineers is responsible for new railway construction and maintenance-of-way of utility railways not covered in *a* above.

3.20. Railroad Maintenance Agreements

a. TRANSPORTATION CORPS. Except as indicated in *b* below, the Chief of Transportation is responsible for making traffic and operating agreements contracts with rail carriers to move persons and property to and from points on Government-owned railroad tracks, and to and from other necessary

* Petroleum Directives available through Regional Offices, PAW.

points. These agreements or contracts will be executed by officers designated by the Chief of Transportation. Agreements or contracts which include provisions for maintenance or repairs of Government-owned railroad trackage will be coordinated with the Chief of Engineers before they are signed.

b. CORPS OF ENGINEERS. Officers designated by the Chief of Engineers will make contracts involving construction or acquisition of new Army installations within Continental United States, exclusive of Alaska. These contracts will be referred to the Chief of Transportation for approval of transportation matters at the same time that they are referred to the carriers concerned.

3.21. Rails and Track Materials

a. CENTRAL ALLOCATION BY OCE. Rail and track materials and equipment for projects built or maintained under direction of post engineers will not be centrally allocated by OCE without specific request through channels. The office issuing the requisition will issue confirming purchase orders and follow all rules governing purchase allocations.

b. REQUISITIONS. Requisitions are required for all rail and track items. Requisitions for central allocation of rail and track materials will include information on weight of rail, length in linear feet, with or without fittings, number and size of turnouts, Controlled Materials Plan allocation symbol for accessories and turnouts, etc.

c. CHANGES OR CANCELATIONS. Once purchase allocations are issued, cancelations or changes in quantities, capacities, types, grades, deliveries, etc., will be permitted only with approval of OCE. No changes will be made or authorized by Corps of Engineers field representatives.

3.22. Utility Railroad Maintenance Equipment

For information on utility railroad maintenance equipment, see paragraph 3.79.

3.23. Manufacturing Plants

Maintenance of track and track equipment is a repairs and utilities responsibility at industrial sections of Government-owned and operated Chemical Warfare Service and Ordnance Department armories, arsenals, and proving grounds; operation and maintenance of rolling stock and loading and unloading equipment are responsibilities of the operating service. For a list of facilities to which this policy applies, see paragraph 1.9.

3.24. Flagman and Watchman Service

a. FLAGMEN. Railroad-company flagmen required because of repairs to utility railroads will be paid from repairs and utilities funds available for maintenance and repair of real property.

b. WATCHMEN. Crossing watchmen perform duties which are related to normal railroad operation and, therefore, will be paid from available operating funds.

3.25. Changes in Rail Facilities

To help the Traffic Control Division, Transportation Corps, keep rail-facility maps current, the post engineer will submit maps to the service command transportation officer as soon as practicable after changes in rail facilities are made. Maps will show in detail all additions, deductions, or relocations of trackage or other changes in rail facilities, and will indicate the number of linear feet of track changed.

3.26. Leased Facilities

Certificate in accordance with Public Law 530, 77th Congress (par. 2.33) is not required for leased-railroad repairs, alterations, or improvements. Limitations of the Economy Act apply specifically to leased buildings and structures or parts of buildings and structures.

Section V. SNOW REMOVAL AND WINTER MAINTENANCE

3.27. Responsibility

Snow-removal service is a repairs and utilities function.

3.28. Snow Removal at Landing Fields

The commanding officer of an airfield will be responsible for setting the standards for snow removal and winter maintenance at the field. Maintenance should be governed by the following standards:

a. In continental United States, snow will be removed from runways.

b. At Air Transport Command airdromes, work should be conducted so there will be little or no interruption in use of landing-field facilities.

c. At the discretion of the commanding officer of the installation, airfield use may be suspended to permit efficient operation of snow-removal equipment.

d. In general, runways will be considered usable in emergency when the cleared area is 150 feet wide, and when snow banks within 100 feet of either side of the cleared area are no more than 3 feet high and are sloped at the edges adjoining the cleared runway.

3.29. Ice Alleviation

Minimum amounts of calcium chloride or sodium chloride may be mixed with aggregates to produce proper braking surfaces for airplane traffic. Alkalinity of sand-chloride mixtures may be reduced by solution treatment and by storing mixtures for 10 to 30 days before use.

3.30. Spare Parts for Snow-removal Equipment

For discussion of spare parts for snow-removal equipment, see paragraph 3.81.

Section VI. GROUNDS

3.31. General

a. RESPONSIBILITY. The post engineer's grounds-maintenance responsibilities include revegetation, renovation, fertilization, and grass mowing, and the use and care of all incidental maintenance equipment. Grounds-maintenance and dust- and erosion-control technicians on the staffs of service command engineers will supervise projects and assist in programs for maintaining and expanding vegetated areas and dust- and erosion-control work at class I, II, and IV installations. They will give technical assistance to class III installations when requested and will make technical inspections of class III installations to insure that prescribed standards, procedures, and policies are being followed. Service command engineers and AAF commands can get help from organizations such as the U. S. Department of Agriculture, U. S. Department of Interior, and State Agricultural Experiment stations in preparing plans, recommendations, and specifications for revegetation projects under consideration.

b. LIMITATIONS. Revegetation and dust- and erosion-control projects will not include work done merely as a contribution to *beauty*, convenience, comfort, or prestige. The level of work should be no higher than needed to keep property in serviceable condition. Civilian gardeners at class I, II, III, and IV installations will be paid from repairs and utilities funds when their work meets the "spartan simplicity" standard set in paragraph 2.2*b*, is necessary grounds maintenance, and is a part of the repairs and utilities responsibility of the Commanding General, AAF, or the commanding general of the service command. Under restrictions imposed by War Department economy directives, landscaping, grounds beautifying, maintenance of flower beds and greenhouses, and similar work are not proper charges against repairs and utilities funds. Expenditures will be made for revegetation and dust and erosion control only when the work is utilitarian and results in a net savings to the War Department.

3.32. Grounds-maintenance Personnel

To insure effective dust and erosion control and protect the War Department's investment in vegetative cover, experienced grounds-maintenance supervisor should be employed at AGF and AAF stations whenever warranted by the acreage of grounds to be maintained and the responsibility involved.

3.33. Street and Area Marking Signs

The post engineer is responsible for preparing, erecting, and maintaining street and area marking signs. Traffic-control signs and pavement markings will conform to provisions in TM 5-618 (when published).

3.34. Policing

a. GENERAL. General policing, such as picking up paper and cigarette butts, is not a grounds-maintenance responsibility of the post engineer under AR 100-80 and is not properly chargeable against repair and utilities funds. Enlisted personnel and prison labor may be used for this work; where prisoners of war are available, they should be used to the maximum. (See Pars. 1.34 and 1.35.)

b. AIRFIELDS. Grassed areas in airfields must be policed before mowing to prevent excessive damage to mowing equipment and the need for costly repairs. This is the post engineer's responsibility. (See AR 100-80.) Refuse and debris can best

removed from the airfield immediately after planting and before the surface is overgrown. These areas should be policed periodically as part of regular grounds-maintenance operations, with available prisoner labor and/or prisoners of war doing the work whenever possible.

c. VEGETATED AREAS. AR 100-80 makes the post engineer responsible for policing vegetated areas not near occupied buildings; debris such as rocks, wire, and lumber which would interfere with grounds-maintenance operations of mowing, soil-erosion control, drainage, etc., must be removed. Repairs and utilities funds can be used for this work.

3.35. Burning

Burning grass or other vegetation destroys the vegetative cover, often increases the dust and erosion problem, and is generally wasteful, destructive and hazardous. Timely mowing during the growing season will eliminate the need for burning over established vegetation. Decisions on the advisability of burning over individual areas should depend on whether established vegetation will be injured, as determined by the agronomist on duty at service command headquarters.

3.36. Hospital Grounds

The policy in paragraph 2.2*b* permits lawns and a minimum number of shade trees to be grown near ward and administration buildings at general, regional, and station hospitals.

3.37. Athletic Fields and Parade Grounds

The post engineer can carry out revegetation projects on athletic fields and parade grounds as part of grounds maintenance when the work is utilitarian and will result in controlling dust and destructive soil erosion. However, unless arrangements can be made with post commanders to retire the area from active use long enough to insure satisfactory growth of plantings, repairs and utilities funds cannot be spent for such work.

3.38. Agricultural Lands

a. POST ENGINEER'S RESPONSIBILITY. The post engineer, under supervision of the post commander, is responsible for maintaining agricultural lands such as hayfields, pastures, orchards, and vineyards which are located on the post reservation. He is also responsible for cultivating, fertilizing, spraying, pruning, seeding cover crops, and other work essential to crop maintenance. Repairs and utilities funds can be used for this purpose. For policy governing purchase of farm machinery and equipment, see paragraph 3.80.

b. POST COMMANDER'S RESPONSIBILITY. Post commanders are responsible for general management of agricultural lands and crops on the post reservation; they will decide how the land is to be used and its crops distributed. When the post commander decides that crops growing on the reservation are to be used by the Government, he can use Quartermaster Corps funds to harvest, bale or pack, process, store, preserve, and distribute the crops.

3.39. Landing Fields

a. CROP PRODUCTION. Landing fields should not be operated for hay production, but should be managed so maximum density of cover is provided. Outlying areas which are so extensive or so far removed from operational areas that they can be treated as nonuse areas from the standpoint of mowing and fire-hazard control may be maintained in the most convenient manner. Before crop-production contracts are entered into, even on nonuse areas, the possibility of interference with operational activities should be cleared with appropriate AAF personnel on the post.

b. MOWING. Vegetated landing fields at AAF stations cannot be satisfactorily maintained if close mowing practices like those used on lawns, parks, and golf courses are followed. Vegetative cover on a landing field should never be mowed shorter than 3 inches.

3.40. Manufacturing Plants

As part of their repairs and utilities responsibilities, post engineers are responsible for all maintenance of walks, grounds, woodlands, channels, anchorage ways, seawalls, walls, etc., on real property at all Chemical Warfare Service and Ordnance Department manufacturing plants.

3.41. Cemeteries

a. POST CEMETERIES. (1) *Selecting sites.* The criteria below will be a guide to selecting post cemetery sites at permanent posts; for additional information, see AR 210-500.

(*a*) *Topography.* Relatively level ground is preferred, with gentle pitch for drainage. Grass cover will not drain freely if pitch is less than 2 percent, unless soil is unusually porous.

(*b*) *Soil conditions.* Soil should be dry and well drained, with water table at least 7 feet below exist-

ing surface. Sites showing rock outcrop should be avoided. Soil data or samples are required by AR 210-500; test pits should be dug to learn depth of water table and whether there is rock within 7 feet of surface.

(*c*) *Surroundings.* Isolated area is preferred, free from noise and distraction of post activities.

(*d*) *Accessibility and approaches.* Easy accessibility is desirable. However, for economy of maintenance there should be only one approach.

(*e*) *Acreage.* Size should be based on estimated burial requirements. (See (2) below.) Post cemeteries should be planned for no more than 25 years of use.

(*f*) *Foliage.* Existing trees should be spaced openly throughout site. Root growth of densely concentrated trees would disturb graves.

(2) *Planning.* Proposals for post cemeteries will be submitted to OCE with a small-scale *key map* or *use map* of the entire post. The map will have enough detail to show the limits of areas already developed; areas will be labeled to show their use for housing, storage, warehouse area, training aids, motor-storage area, etc. Wherever possible, the map will indicate probable and/or possible expansions of present use areas and their relationship to the proposed cemetery sites. The Chief of Engineers will decide whether the site is suitable on the basis of future post development and will advise the post commander of his decision. A preliminary site lay-out plan will then be prepared and submitted to OCE for review and submission to the Office of the Quartermaster General. The plan will be detailed enough to show proposed location, size, and number of burial lots and blocks of lots, roads, utilities, etc.

(*a*) *Lots.* Lots will be 10 by 5 feet for enlisted men and civilians, and 12 by 12 feet for officers. No lot will be more than 200 feet from a turf path or road providing hearse access; this will limit the maximum size of a block. Roads, if any, will be 20 feet wide; turf paths used for maintenance will be 10 feet wide, with a 5-foot clearance to graves or blocks of graves on either side; if used only for pedestrians, turf paths between blocks of graves will be 5 feet wide. Topography will dictate the lay-out of blocks and roads; the latter will follow the existing terrain closely, avoiding construction of banks subject to erosion, and providing minimum grading but suitable drainage. There will be as few drainage structures as possible. Curving roads are desirable only if made necessary by existing topography and to avoid gradients in excess of 4 percent. Simplicity in lay-out and low maintenance cost are the most desirable criteria.

(*b*) *Post plot.* Sections of the post plot will be lettered consecutively: A, B, C, etc.; if it becomes necessary to increase the area, each additional section will be given the next letter in the sequence. Graves in each section will be numbered in sequence, starting with number 1.

Graves will be 5 feet deep. Special care will be taken to have graves aligned laterally and longitudinally, so headstones will line up. Headstones will be set on the center line at the head of the grave with the inscription facing the grave and with their upper portions 24 inches above the ground.

(3) *Maintenance.* The Chief of Engineers is responsible for operating and maintaining post cemeteries. This includes maintenance and care of grounds, walks, roads, drainage, and inclosing walls or fences; opening and closing graves; soil-erosion control; procuring and setting headboards; setting permanent headstones at graves; care of shrubs trees, grass, and flowers; preparing budget estimates and budgeting and distributing funds. The Chief o Engineer's responsibility also includes providing ma terials, operating supplies, and equipment needed t carry out the maintenance program.

b. PRIVATE CEMETERIES IN MILITARY RESERVATIONS. (1) *Reservations owned by United State.* The War Department will not acquire title to ceme teries within the boundaries of military reservation owned in fee by the United States, unless possessio is essential to efficient operation of the reservation traffic through the cemetery cannot be controlle otherwise. Commanding officers are responsible f protecting the cemetery by fencing, policing, and p troling when necessary. There is no legal authori for spending money to improve such cemeterie however, AR 210-10 makes the post commander r sponsible for insuring that the cemetery is kept cle and attractive. Under authority of AR 100-80, t post engineer will carry out this work, includi maintenance necessary or incidental to upkeep of t cemetery, grounds, lawns, trees, shrubs, plants, roa walks, drains, fences, and walls. Burning weeds a grass is undesirable as it will mar and deface tor stones.

(2) *Leased reservations.* In maintaining ce teries in areas leased by the United States, the c manding officer should be guided by agreem among the interested parties. The commanding cer will provide protection for the cemetery fencing, policing, and patroling when necessary.

c. NATIONAL CEMETERIES. Regulations for government and care of National Cemeteries are contained in National Cemetery Regulations, approved by the Secretary of War and published by the Quartermaster General. The Quartermaster Corps is responsible for maintenance and operation of National Cemeteries.

Section VII. REFUSE COLLECTION AND DISPOSAL

3.42. General

Post engineers are responsible for collecting and disposing of all refuse and for collecting all salvage except that collected by contract or subject to accountability. They are not responsible for disposing of salvage. Collections may be made by other organizations or by contractors, but the post engineer remains responsible for the economy and efficiency of such arrangements. Service command refuse collection and disposal personnel are available to assist class I, II, III, and IV installations in—

a. Determining the most suitable methods of collection and disposal,

b. Organizing the collection systems,

c. Selecting sanitary fill sites,

d. Initial installation of sanitary fills and regulated dumps,

e. Instructing refuse disposal operating personnel.

They will also inspect segregation, collection, and disposal operations periodically in accordance with established procedures.

3.43. Refuse

Refuse includes all garbage, trash, and debris from which salvage has been removed by the responsible agencies. Segregation of the various classes of refuse and salvage is done prior to collection and is not the responsibility of the post engineer. However, the post engineer is responsible for keeping separate, during collection, the segregated classes of refuse and salvage. He will notify the post commander of incomplete segregation at points of assembly and will cooperate generally in the salvage program.

3.44. Disposal Facilities

All posts, camps, and stations must be provided with adequate refuse disposal facilities. The approved systems applicable to most posts are sanitary fill, incinerators supplemented by regulated dumps, and removal from the post. Burning pits, burn-and-cover systems, and garbage grinders are approved methods of disposal under special conditions. Open dumping of garbage and trash creates potential health hazards by providing rodents, flies, and mosquitoes with ideal places to live and multiply. Therefore, open dumping of garbage and combustible trash will not be permitted on military reservations.

3.45. Sanitary Fill

Because of its flexibility, low installation and operating costs, and low personnel requirements, the sanitary-fill system of refuse disposal should be installed in preference to building an incinerator. However, a sanitary fill will not be installed or operated if no suitable site is available or if soil or climatic condition make the required earth-seal covering uneconomical or impractical. Sanitary-fill systems will not be installed at posts, camps, and stations of 1,200 men or less or at general hospitals. Sanitary-fill operation should follow closely methods outlines in TM 5-634 (when published). Slight variations are acceptable if refuse is compacted and covered each day, and if there is no burning.

3.46. Incinerators

Incinerator procedures should be organized with maximum efficiency to avoid the need for added incinerator or sanitary-fill equipment. Essential factors are: correct salvage procedures; eliminating, at the sources, incombustibles and excess water from refuse intended for incineration; well-scheduled deliveries of refuse to incinerator platforms; and good manual operation. Incinerators which are adequate for post requirements should be kept in operation; another disposal method will be substituted only if the change will result in a worth while reduction in personnel and/or operating cost.

a. OPERATION. Methods of incinerator organization, operation, and maintenance will follow closely the instructions in TM 5-634. If a single shift of operating hours is insufficient, a system of staggered working hours will be used in preference to two shifts.

b. SAFETY FACTORS. Safety guardrails will be installed on all top-feed incinerators. After operating

hours, rubbish must not be left on or delivered to the charging floor or loading platforms. Explosive or highly inflammable materials must not be delivered to or charged into incinerators.

c. CONSTRUCTION REQUESTS. Because of the peculiarity of incinerator construction, all requests for incinerator construction at class I, II, III, and IV installations will be forwarded to the Chief of Engineers, accompanied by detailed recommendations of the refuse collection and disposal section of the service command.

3.47. Dumps

Regulated dumps may be used to dispose of incombustible trash, forestry products, nonsalvable scrap lumber which is not suited to incineration or sanitary fill, and refuse such as ashes and street sweepings. Dumps may not be used to dispose of combustible trash or garbage. Regulated dumps will be kept as small in area as practical. The preferred height of dump face is not more than 4 feet. Every month, loose materials will be compacted and covered with 12 inches of earth or ashes. All inactive open dumps will be effaced by compacting loose materials and covering them with 12 inches of earth or ashes. Procedures relating to dumps will follow closely instructions given in TM 5-634.

3.48. Removal from Post

Post engineers are responsible for arranging contracts for collecting and/or hauling refuse off post and/or for disposing of it off the reservation. Care will be taken that the ultimate disposal method will not create a public nuisance. Contracts or arrangements can provide that the Government pay the contractors, but arrangements must be in the best interests of the Government. Payment can be made from repairs and utilities funds.

3.49. Burning Pits

Masonry burning pits or three-sided earth revetments are adequate for refuse disposal at depots and similar installations; however, they must be approved by fire-prevention agencies.

3.50. Burn and Cover

At small installations, such as class A installations, prisoner of war branch camps, or installations having only a small station complement where the daily production of refuse is too small to warrant the expense of building a permanent incinerator or equipping the installation with motorized vehicles for operating a sanitary fill, an acceptable method of refuse disposal is to trench each day's refuse and burn it and to cover the residue weekly. This method is described in TM 5-634. While requests for adequate disposal facilities are being processed for posts other than small installations mentioned above, a modified system of burn and cover is acceptable as a temporary expedient. Under this system, refuse is burned daily and the residue effectively covered with earth at least weekly.

3.51. Garbage Grinders

Garbage grinders supplemented by incinerators or burn and cover system for trash are an adequate method of disposal at water-bound or similar harbor defense installations.

3.52. Stands and Receptacles

Post engineers will provide suitable receptacles for segregation of refuse and salvage into specific classes to meet the requirements of salvage regulations and of the collection and disposal system. They will also provide receptacle stands, located to facilitate collections. For detailed information on stands and receptacles, see TM 5-634.

Section VIII. CONTROL OF INSECTS, RODENTS, AND OTHER VERMIN

3.53. Responsibilities

a. MEDICAL OFFICER. The medical officer at a military installation will be responsible for—

(1) Health of personnel.

(2) Investigating the prevalence, distribution, and significant habits of insects, rodents, and other vermin.

(3) Recommending control measures and furnishing advice for the health and morale of personnel.

(4) Providing technical supervision when necessary to carry out control measures.

(5) Determining and reporting on adequacy control or corrective measures.

b. POST ENGINEER. To preserve property and protect health and morale, the post engineer will responsible for eradicating or controlling insects, rodents, and other vermin in real property. (See AR 35-6520.) He will perform this work under direction of the post commander, and in accordance w

recommendations of the Medical Department; the Medical Department will provide necessary technical supervision. The work will include:

(1) Construction and maintenance such as screening, draining swamp areas, ditching, spreading oil, and fumigating buildings.

Note. Troop units or individuals are responsible for ordinary housekeeping control measures.

(2) Procuring, purchasing, storing, and issuing all specialized supplies and equipment normally supplied by the Corps of Engineers for post control or eradication.

c. QUARTERMASTER SUPPLY OFFICER. The quartermaster supply officer will store and issue standard supplies for insect, rodent, and vermin control for use by troops, individuals, and post engineers. Standard supplies include those used in barracks, mess halls, kitchens, bakeries, laundries, storage warehouses, depots, and similar facilities; for clothing and equipage; and for personnel listed in AR 40-205, 40-210, 100-80, and TM 5-632 (when published).

3.54. Material and Equipment

a. GENERAL. Material and equipment authorized for use by the post engineer in pest control or eradication will be obtained by requisition on the service command engineer or by local purchase as directed by the service command engineer.

b. TYPES. Authorized material and equipment includes:

(1) Paris green, 5-pound can.

(2) HCN discoids or fumigants.

(3) Duster, pest exterminator, powder, rotary type, including spare parts.

(4) Sprayer, insecticide, knapsack cylinder type, 3-gallon capacity.

(5) Sprayer, insecticide, portable piston pump, gasoline-engine driven, 1 to 3 gallons per minute.

3.55. Fly Traps

In accordance with recommendations of the Surgeon General and the Quartermaster General, the Chief of Engineers is responsible for the design, procurement, distribution, and installation of fly traps at posts, camps, and stations. Type A-1 fly traps (sketch No. 52) may be built by the post engineer or procured by local purchase. The post surgeon will recommend allowances and locations of fly traps on the basis of sanitary regulations and local conditions. Fly traps should never be placed inside buildings.

3.56. Manufacturing Plants

Post engineers are responsible for all insect, rodent, and vermin control on real property at industrial sections of Chemical Warfare Service and Ordnance Department Manufacturing Plants. For a list of facilities to which this policy applies, see paragraph 1.9.

3.57. Army Property in Storage

Post engineers will assist storage officers in periodic fumigation of depots and warehouses or in other methods of controlling insects and rodents which might damage or destroy Army supplies. Storage officers will inspect stocks of supplies and property frequently, and will secure the assistance of post engineers when necessary. To insure that proper safety precautions will be taken, post engineers will request technical assistance from the entomologist on duty at service commands before initiating a program of fumigation.

3.58. Cooperation of Other Agencies

Specialists from the Fish and Wild Life Service, Department of Interior, will help post engineers control or eradicate rodents and predatory animals which are a menace to health or are destroying public property. Specialists from the Bureau of Entomology and Plant Quarantine, Department of Agriculture, will offer consultation and guidance in controlling termites, Japanese beetles, and grasshoppers. Requests for services of these specialists at class I, II, III, and IV installations will be made to the commanding general of the service command.

3.59. Property Near Military Reservations

Responsibilities of the War Department and the Public Health Service for pest control on property adjoining or near military reservations are covered in a joint memorandum dated 23 December 1943. Details of the memorandum are discussed below.

a. GENERAL. If the incidence of insects, rodents, or vermin on private property adjoining or adjacent to military reservations constitutes a *menace* to the health of military personnel, control measures are the responsibility of the U. S. Public Health Service. However, if insects, rodents, or vermin are *nuisances* only and interfere with the training program of troops in off-post areas, Public Health Service funds cannot be utilized for control.

b. U. S. PUBLIC HEALTH SERVICE. (1) If it is believed that the incidence of insects, rodents, or vermin in an extra-military area constitutes a *menace* to the *health of the command,* the post commander

may submit a request through service command or AAF command for a survey of the area by the Public Health Service. If it is determined that a *health hazard* exists, the Public Health Service, acting under agreement between the Secretary of War and the Federal Security Administrator, will undertake the necessary work at its own expense.

(2) If pest mosquitoes, rodents, or other vermin do not constitute a significant *health hazard* in an extra-military area, but the post commander finds that they *interfere materially with the training program of troops,* he may submit a request through service command or AAF command for the Public Health Service to carry out the control program subject to reimbursement from funds available for mosquito-control work under the appropriation Engineer Service, Army. The post commander's request will be accompanied by a full report on conditions, including the extent and seriousness of interference with or effect on the troop training program. No control project of this nature will be carried out until a survey of the work to be done and an estimate of its cost are made jointly by representatives of the Public Health Service, the post engineer, and the post surgeon.

c. POST ENGINEER. If the conditions in *b*(2) above, exist and the Public Health Service informs the service command or AAF command that it is *not* available for carrying out the desired control measures, the post commander may direct the post engineer by a signed copy of WD AGO Form 5-25 to accomplish the necessary control measures, using funds available for mosquito-control work under the appropriation Engineer Service, Army. No control project of this nature will be carried out until a survey has been requested and made as outlined in *b* (2) above. Before the post engineer enters an extra-military area to carry out control measures, a written agreement providing for right of entry and waiver of claims will be entered into with the private land owner.

d. LIMITATION OF EXPENDITURES. (1) No projects mentioned in *b*(2) and *c* above, which involve the expenditure of $10,000 or less will be begun without approval of service command or AAF command. Approval for projects estimated to cost more than $10,000 will first be secured from the Chief of Engineers for class I, II, and IV stations and the Commanding General, AAF, for class III stations. The Chief of Engineers or the Commanding General, AAF, will coordinate the project with the Surgeon General.

(2) No more than 20 percent of the funds available in each service command or AAF command for insect and rodent control will be spent on new control measures or maintenance of existing measures in extra-military areas without prior approval of the Chief of Engineers for class I, II, and IV stations and the Commanding General, AAF, for class III stations.

e. MAINTENANCE OF CONTROL MEASURES. If the Public Health Service performs control measures outlined in *b*(1) above, any necessary recurrent maintenance is a responsibility of that service. However, if control measures are executed as in *b*(2) above, necessary recurrent maintenance will be performed by the Public Health Service, if available subject to reimbursement; otherwise, they will be carried out by the post engineer at the direction of the post commander. The post engineer is responsible for recurrent maintenance of control measures which he performs.

f. REIMBURSEMENTS. The War Department will reimburse the Public Health Service for control operations which that service undertakes under provisions of *b*(2) above, by means of Standard Form 1080, supported by the joint memorandum of 23 December 1943.

Section IX. SHOP TOOLS AND EQUIPMENT AND INSTALLED EQUIPMENT

3.60. General

Maintenance activities at posts, camps, and stations have been integrated to conserve personnel and shop equipment. However, post engineers' utilities shops are not included in this integration; they will continue to operate as heretofore but will make maximum use of the combined maintenance shops' facilities to repair equipment. Conversely, post engineer shops will do all maintenance work which is within their scope but outside the scope of combined maintenance shops. Outside commercial facilities will be employed only when all shop facilities on the post are inadequate. The post engineer will be responsible for repairing certain wooden items and manufacturing parts for wooden truck bodies. Only light woodworking equipment which does not duplicate equipment in the post engineer carpenter shop will be furnished the miscellaneous equipment section of the clothing and equipment shop.

3.61. Shop Equipment

When small tools and other portable equipment needed for repairs and utilities work are not available from excess lists, they will be purchased locally from funds available to post engineers. Heavy utility shop equipment and portable equipment purchased centrally by OCE are listed in the Equipment Manual for Area and Post Engineers; this equipment is stocked in division engineer warehouses and is available on requisition. In addition, special equipment for which a general need may exist from time to time can also be made available through central procurement by OCE or through service command procurement. Requisitions for centrally procured items to be used within the service command will be prepared by post engineers on WD AGO Form 445 for initial issue, replacement, or justified special purposes; they will be submitted through channels to the commanding general of the service command, attention service command engineer, for approval and supply. The requisition will include a complete statement covering: basis for requisitions; housing capacity of post, camp, or station; justification; how and where equipment is to be used; and complete information necessary for technical review. The service command engineer will edit requisitions; when they are approved, he will forward them to the division engineer warehouse for supply. If justified requisitions for standard and nonstandard items of heavy utility shop equipment cannot be supplied from stock on hand, due in, or earmarked, they will be forwarded to OCE for action, accompanied by the service command's recommendations.

3.62. Post Engineer's Relation to Combined Shop

a. COMBINED SHOP PLAN. The principles announced by the War Department to the effect that existing facilities on a post are available, within their capabilities, for accomplishment of the repair of any item of War Department equipment without reimbursement, apply also to installations where combined shops have *not* been established. All facilities of a post are for the use of the commanding officer thereof within such limitations as may be placed thereon by War Department directives. Funds available to the service or service command, or air force or AAF command responsible for the particular shop are properly chargeable with the cost of such necessary operations.

b. POST ENGINEER SHOPS. Post engineers at all class I, II, III, and IV installations, including regional post engineer shops not located at a post, camp, or station, will upon request accomplish, without reimbursement, miscellaneous maintenance and repair of equipment and the fabrication of nonstandard items of furniture and nonstandard items of equipment within the scope and capacity of their repairs and utilities shops, with repairs and utilities materials normally available, using repairs and utilities funds available locally, provided:

(1) *Fabrication.* (*a*) The item to be fabricated, or an acceptable substitute, cannot be obtained within the required time, through normal supply channels, or procured through normal procurement channels by the requesting agency. The item fabricated will be limited to the simplest and most inexpensive type, sufficient only to meet the requirements of the using agency.

(*b*) The post commander personally approves in writing the necessity for fabrication of the item.

(*c*) The work is a proper charge against War Department appropriations available to the installation where the work is to be performed.

(*d*) The project is approved in accordance with AR 100-80.

(2) *For maintenance.* (*a*) The item to be repaired is considered by the post engineer to be economically repairable.

(*b*) The work is a proper charge against War Department appropriations available to the installation where the work is to be performed.

(*c*) The maintenance performed is within the provisions of paragraph 2.2*b*.

(*d*) The project is approved in accordance with AR 100-80.

c. SUPPLIES AND SPARE PARTS. In accomplishing the above-defined work the post engineer will use repairs and utilities materials normally available in post engineer shops with the following exceptions:

(1) *Fabrication* (as defined in par. *b*(1) above). Any required supplies and spare parts *not* normally stocked by the post engineer will be furnished by the agency requesting the work.

(2) *Repair.* Any required supplies and spare parts *not* normally stocked by post engineers will be furnished by the agency responsible for maintenance.

d. WORK ORDERS. A file of orders for fabricated items will be maintained by the post commander for periodic inspection by a disinterested commissioned officer, normally from the Inspector General's Department, to be designated by the commanding general of the service command, ASF, or the command-

ing general of the air force or AAF command to determine that a satisfactory control is exercised.

e. BEYOND CAPACITY OR SCOPE OF POST ENGINEER SHOPS. When required maintenance, repair, or fabrication of any item is beyond the capacity or scope of the post engineer's facilities and the other shops available to the installation, the item will be evacuated to the appropriate higher echelon shops in normal manner.

f. ACCOUNTABILITY. Items of equipment fabricated in a post engineer or other shop, whether standard or nonstandard, will be listed upon a shipping ticket or other appropriate form when released to the requisitioning agency. A receipt will be obtained for the property, and the receipted copy of the shipping document, together with related copies of work orders, filed as now prescribed. Shipping documents covering fabricated property received by the requisitioning agency will be assigned voucher numbers to regular stock record account, and the equipment picked up in the accountable property records.

3.63. Shops at Class IV Installations

To avoid duplications and insure economy of maintenance facilities and personnel, no new maintenance shops or subshops will be activated at class IV installations within service commands and no existing shops will undergo major expansion until authorized by the Commanding General, ASF.

3.64. Manufacturing Plants

Where the activity is primarily industrial, the operating service is responsible for operating maintenance and utilities shops and maintaining installed equipment at industrial sections of Government-owned and operated Chemical Warfare Service and Ordnance Department armories, arsenals, and proving grounds. Where the activity is primarily fo general post purposes, operation of maintenance an utilities shops and maintenance of installed equip ment is a repairs and utilities responsibility of th Corps of Engineers. Separate shops will be provide only when justified by a large amount of non industrial use. For a list of facilities to which thi policy applies, see paragraph 1.9.

3.65. Used Shop Tools and Equipment

Used shop tools, machinery, and equipment othe than controlled items may be purchased by post engi neers within limitations defined in AR 100-80; ther is no objection to purchasing second-hand tools s long as they are satisfactory for their intended use.

3.66. Installed Equipment

Requests for equipment which requires installatic should be submitted as project requests on WD AG Form 5-25 when the estimated cost of equipment an installation exceeds $1,000. This will eliminate th possibility of equipment being shipped on requisitic and then having its installation disapproved.

3.67. Increased Mess Equipment

Additional equipment for mess halls operating und AR 210-60 may be provided from appropriate funds when an increase in personnel is authorized.

3.68. Butcher Blocks

Butcher blocks, 30 by 30 by 16 inches, will be issu by Quartermaster Corps in accordance with T/A 2

3.69. Electric Fans

Procurement and distribution of new portable ele tric fans is prohibited. However, distribution of e isting depot stocks is not affected by the circular.

Section X. OUTSIDE MAINTENANCE TOOLS AND EQUIPMENT

3.70. Repairs and Utilities Equipment

a. LIMITATIONS ON PURCHASE. For limitations on purchasing repairs and utilities equipment, see paragraph 1.37.

b. PREVENTIVE MAINTENANCE. Policies governing maintenance of repairs and utilities outside construction and maintenance equipment are outlined in TM 5-625 (when published). Service command engineers will conduct technical inspections to ascerta whether a complete program of preventive maint nance of outside construction and maintenance equi ment is being conducted. The maintenance progra will include:

(1) First-echelon maintenance:

(*a*) Performed by and the responsibility of t equipment operator.

(*b*) Performed daily.

(*c*) All pertinent services listed on rear of WD Form 48, and any additional services peculiar to an individual unit.

(2) Second-echelon maintenance:

(*a*) Performed by post engineer mechanic assisted by regular equipment operator.

(*b*) Performed at 64-hour (weekly) or 256-hour (monthly) periods as specified in Technical Manuals, Technical Bulletins, Lubrication Orders, or manufacturers' manuals.

3.71. Used Machinery, Tools, and Equipment

Used maintenance machinery, tools, and equipment other than controlled items may be purchased locally by post engineers if the items cannot be gotten by transfer from excess lists and if the approving authorities stated in AR 100-80 are followed. Secondhand tools and equipment must be checked before purchase to insure that they are serviceable and satisfactory for their intended use.

3.72. Renting Equipment

Funds will not be adjusted when equipment owned by any military project or activity is rented to another military project or activity. Cost of repairs to such equipment will be met from funds available to the project or activity which repairs the equipment. Rental for equipment owned by any military project or activity which is rented to projects financed with nonmilitary funds and for equipment owned by projects or activities not financed with military funds which is rented to military projects or activities will be paid through an adjustment of funds on Standard Form 1080.

3.73. Repairing Post Engineer Equipment

Engineer equipment assigned to post engineers will be repaired on the post if facilities are available. If the necessary facilities are not available on the post, the division engineer will be responsible for providing repair facilities; ESA project 410 funds available to the division engineer can be used for this purpose. No reimbursement will be made. Post engineer equipment which has been turned over to division engineers for repair only will be returned to the post engineer when repairs are completed.

3.74. Athletic or Recreational Facilities

Although appropriated funds are not available for developing athletic facilities, maintenance equipment available to the post engineer can be used for this purpose if it will not interfere with performance of repairs and utilities responsibilities. Post engineers will follow provisions of appropriate War Department authority when furnishing materials, supplies, equipment, or services to provide or improve recreational buildings or facilities. The post engineer will not *extend* his priority ratings to procure any items for such projects; no equipment which requires a priority for replacement will be withdrawn from post engineer stocks unless it is subsequently replaced. (See par. 1.16.)

3.75. Manufacturing Plants

The operating service will be responsible for operation of mobile maintenance equipment and special-purpose vehicles in industrial or proof sections of Government-owned and operated Chemical Warfare Plants and Ordnance Department proving grounds. Operating such equipment is a repairs and utilities responsibility when used for maintaining all other features of general usage. For a list of facilities to which this policy applies, see paragraph 1.9.

3.76. Issue to Troops and Prisoners of War

For information on issuing tools and supplies to troops and prisoners of war, see paragraph 1.52.

3.77. Motor Vehicles

a. RESPONSIBILITIES. Responsibilities for procurement, maintenance, storage, and issue of maintenance parts for automotive equipment is covered in WD Circular 240, 1944.

(1) *Ordnance Department.* The Ordnance Department is responsible for designing, developing, and procuring general-purpose wheeled vehicles and chassis of special-equipment wheeled vehicles.

(2) *Other technical services.* The using technical service is responsible for designing, developing, and procuring special-purpose wheeled vehicles and special bodies or equipment. Before beginning development of special-purpose wheeled vehicles, a using technical service will consult with the Ordnance Department and will make every effort to use a general-purpose vehicle. Special-purpose vehicles will use standard parts and assemblies unless it is clearly shown that these will not be satisfactory. Using arms or services will collaborate in designing and developing all vehicles. For more detailed information, see AR 850-25.

b. MODIFICATIONS. General-purpose vehicles which have been modified only slightly to meet repairs and utilities requirements may continue to be considered general-purpose vehicles. If modifications

are so extensive that the vehicles are permanently unfit for general purposes, they are no longer considered in that classification.

c. REPAIRS. Standard ordnance vehicles which can be repaired cheaply will be repaired by service command facilities using parts supplied by ordnance. On request, repairs which can be made cheaply on Corps of Engineers nonstandard vehicles may be performed by ordnance, using parts supplied by the Corps of Engineers. Where there are no engineer repair facilities and ordnance facilities are used to repair nonstandard engineer vehicles, parts will be procured in the same way as for repairs made in an engineer repair facility.

Note. Repairs and utilities funds will not be used for expenses incidental to maintenance and operation of vehicles drawn from the post motor pool.

d. DISPOSITION. (1) *Ordnance vehicles.* To simplify maintenance and to make available to civilians serviceable or easily reparable motor vehicles, 1939 and earlier models of ordnance-issued engineer vehicles will be removed from service.

Note. This does not apply to special-service equipment under jurisdiction of post engineers for repairs and utilities activities.

(2) *Engineer vehicles.* Ordnance will prepare a report of survey on surplus Corps of Engineer vehicles which are turned in to service command pools. When engineer vehicles which are brought to service command shops for repair cannot be repaired economically, the Corps of Engineers will be notified and will prepare a report of survey on the vehicle.

e. PERSONNEL TRANSPORTATION. Basic War Department policy on using Government-owned vehicles to transport military or civilian War Department personnel, employees of contractors with the War Department, or others between their domiciles and places of employment is stated in AR 850-15. Transportation will not be authorized in the following:

(1) Government-owned motor vehicles with a seating capacity of less than 12 passengers.

(2) Government-owned motor vehicles with a seating capacity of 12 or more passengers without approval of the commanding general of the service command, air force, or AAF command concerned.

f. ADMINISTRATIVE USE. Administrative vehicles will be assigned post engineers in accordance with current War Department policy governing the supply of vehicles for administrative use.

g. WEAPONS CARRIERS. The Office, Chief of Ordnance has assigned ½-ton 4 x 4 weapon carriers to each service command for reassignment to individual post motor pools under control of post commanders. These vehicles will be made available to post engineers, when needed, for use in towing high-speed gang mowers at airfields now supplied with this equipment. This use will have priority over other uses; when not needed for this specific purpose, the vehicles will be available for other dispatch.

Note. Hitches and stabilizers designed for attaching Worthington high-speed mowers to ½-ton weapons carrier have been procured by OCE and distributed to each service command for redistribution to posts. Stabilizers are needed for satisfactory high-speed mower operation to eliminate side sway.

3.78. Controlled Items of Equipment

For policy on controlled items of equipment, see paragraph 1.50.

3.79. Railroad Maintenance Equipment

The provisions of AR 55-650 on procurement, operation, and maintenance of railroad equipment are interpreted to mean that the Transportation Corps will estimate for, procure, purchase, store, and issue all locomotives, general rolling stock, and mechanical equipment designed primarily for operation on railroad tracks and required for maintenance-of-way purposes, including motor cars, handcars, self-propelled snow plows, mowers, plows, and other accessories for attachment to locomotives or railroad rolling stock. This equipment will normally be operated and maintained by the Transportation Corps; when needed it will be made available to the Corps of Engineers for maintenance-of-way work for which that service is responsible. Work equipment such as handcars and motor cars may be subassigned to post engineers where expedient or where justified by the volume of maintenance activity at a post.

3.80. Farm Machinery and Equipment

a. LIMITATIONS ON PURCHASE. New farm machinery, equipment, and attachments will be purchased only when—

(1) Authorized in Tables of Allowances, Tables of Organization and Equipment, or special lists prepared by the Commanding Generals, AGF, AAF, or ASF.

(2) Approved War Department requirements have been established on an operational (class IV) basis.

(3) Required for imperative needs not provided for in (1) and (2) above; in such cases, approval of the Director, Purchases Division, Headquarters,

ASF, will be obtained through channels. Requests for purchases will be accompanied by a complete statement of facts establishing the essentiality of the proposed purchase.

b. PURCHASES. Normally, all purchases authorized above will be made direct from the manufacturer. Purchases may be made from other sources only when approved through channels by the Director, Purchases Division, ASF. Requests for approval will give the reason for the need to purchase from a source other than the manufacturer; it will also include the make and model of equipment, name and address of contemplated vendor, and name and address of manufacturer or distributor from whom vendor intends to obtain stock replacement of requested items.

3.81. Spare Parts Supply for Snow-Removal Equipment

Spare parts will be procured locally for snow-removal equipment used at posts, camps, and stations; however, existing stocks available in division engineer warehouses must first be exhausted.

3.82. Fuels and Lubricants

Procurement of fuel and lubricants for use in post engineer equipment is limited to items meeting current Army, Navy, Joint Army-Navy, Federal, or tentative technical service specifications; other items can be procured only when specific authorization is secured from the Quartermaster General, Fuels and Lubricants Division. If prescribed petroleum products are not available or if the available supply is believed not to conform to specifications, a report will be forwarded through supply channels to the chief of the technical service responsible for supplying the product involved. Complaints on the use or effect of prescribed petroleum fuels and lubricants will be processed in duplicate through technical channels to the chief of the technical service responsible for the equipment concerned. War Department Lubrication Orders contain approved first- and second-echelon lubrication instructions for mechanical equipment; Lubrication Orders now available will be carried with or attached to the equipment to which they apply. Instructions contained in them are *mandatory*.

3.83. Tires and Tubes

a. REPLACEMENT TIRES AND TUBES. The term *replacement tires and tubes* includes replacement new, serviceable used, and reconditioned solid and pneumatic tires and tubes and their component parts and repair materials used on wheeled vehicles and combined wheeled and track-laying vehicles operated by all arms, technical services, and the AAF; tires and tubes for materials-handling equipment are included, but those for aircraft are not.

(1) *Responsibility.* The Ordnance Department is responsible for design, development, testing, specification, determination of requirements, provision of funds, purchase, inspection, storage, issue, and inventory control of replacement tires and tubes.

(2) *Replacement.* In emergency, replacement items may be purchased by use of OPA Form R-12. However, no more than two tires and/or tubes will be purchased for one vehicle without written approval of the chief of the technical service responsible for issue.

(3) *Maintenance.* For information on maintenance and care of pneumatic tires, see TM 31-200.

b. SECOND TIRES AND TUBES. A certain percentage of new tires and tubes produced for the Army are rejected by factory and ordnance inspectors. In view of the critical tire shortage, these substandard tires and tubes will be purchased by the Ordnance Department and branded with the word SECOND. They will be purchased only if the factory and ordnance inspectors both estimate they will give at least 75 percent of normal new-tire service.

(1) *Issue.* Second tires and tubes will be issued under Ordnance Department regulations on an exchange basis for unserviceable tires or tubes through tire-collection centers established in each service command.

(2) *Removal from service.* Second tires or tubes removed from service for exchange will be inspected by tire-collection centers under Ordnance Department regulations.

3.84. Antifreeze Solutions

The Bureau of Standards recommends strongly against the use of salt solutions as antifreeze agents for Government vehicles because of their highly corrosive action on cooling systems. The penetrating quality of calcium chloride solution is not materially different than that of water.

Note. Any antifreeze solution finding its way into the crankcase or motor may seriously damage the bearings and moving parts.

3.85. Heaters and Defrosters

One standardized motor-vehicle cold-weather kit will be issued for each truck operating north of 45° North Latitude, except in sections of Oregon and

Washington west of the Cascade Mountains. In areas where climatic conditions justify a departure from this policy, heaters which can be procured locally from funds available to local commanders can be installed in closed-cab vehicles used to operate snow plows.

3.86. Garden Hose

The Corps of Engineers is responsible for procuring water hose and adjustable ¾-inch hose nozzles. Since these items are not centrally purchased or issued by OCE, OCE will direct requests for supply pertaining to post functions to the respective service command headquarters for necessary action. Purchase, storage, and issue of these items for post functions may be handled centrally through service command headquarters or locally by post engineers, whichever is more expedient. Repairs and utilities funds can be used for such purchases.

3.87. Mules

The Quartermaster Corps is responsible for furnishing and maintaining all mules used for military and garrison purposes. (See AR 30-405 and 30-500.) Post engineers will not purchase mules; they will requisition their needs from post quartermasters.

Section XI. PASSIVE PROTECTION

3.88. Definition

Passive protection includes dim-out, black-out, air-raid warning systems, camouflage, structural protection, personnel shelters, and all similar measures for defending military and civil installations.

3.89. Maintenance Responsibility

Passive protection measures at posts, camps, and stations will be maintained by the post engineer under direction of the post commander and under supervision of the service command engineer or the commanding general of the air force or AAF command. Commanding generals of service commands, air forces, or AAF commands are responsible for maintaining structural measures of passive protection which the Corps of Engineers has installed at vital aircraft and industrial plants under directives of the Commanding Generals, ASF and AAF. Plant management is responsible for maintaining passive protection measures installed by plant management under directives of AAF district supervisors.

3.90. Maintenance Standards

a. LIMITATIONS. Maintenance of passive-protection measures at all plants, facilities, and military installations will be limited to the minimum needed for adequate safety of personnel and safe operation of plants, facilities, and installations.

b. VEGETATION. The limitation above does not apply to grass, legumes, or other low-growing vegetation which serves as camouflage for military installations and as an aid in erosion or dust control.

c. PAINT. Paint applied for tonedown or camouflage will not be removed. When repair becomes necessary as part of normal maintenance, no special effort will be made to eliminate camouflage or tonedown.

3.91. Camouflage for Training Purposes

When AAF installations are to be camouflaged as part of the training program, requests for proposed construction will be transmitted by the Commanding General, AAF, directly to the Chief of Engineers. Camouflaging installations for training purposes is not a part of the passive-protection program.

3.92. Passive Defense Concealment Installations

When camouflage or protective-concealment measures interfere with new plant construction or with extensions to existing buildings, the constructing agency will meet the cost of removing them. This is based on the principle that the measures to be removed are like obstacles such as sidewalks or sections of a paved street encountered in preparing a new site for construction, which are removed at the expense of the constructing agency. Occasionally, it may be to the best interest of the Government to dismantle a greater area of the protective-concealment measures than will be needed for new construction; in that case the cost of dismantling the extra area is a proper charge against ESA funds. When no construction work is needed, ESA funds will be used to pay for removing existing protective-concealment installations which interfere with increased plant production or which have become dangerous to personnel or to plant operation.

3.93. Protective Concealment at Vital Aircraft Manufacturing Plants

Many trees, shrubs, and vines were used in building protective-concealment measures at some vital aircraft manufacturing plants. Use of ESA funds to maintain these trees, shrubs, and vines will be discontinued immediately at all installations where the defense command no longer requires them. The manufacturer should always be informed that maintenance is being discontinued. The lease, permit, or agreement under which these trees, shrubs, and vines were placed on property should be checked for provisions on the Government's rights and obligations in removing these items and restoring the premises. In general, trees, shrubs, and vines should not be removed at Government expense during the period of labor shortage. All requests for projects for disposing of trees, shrubs, and vines and restoring the premises will be referred to the division engineer for accomplishment.

3.94. Dismantling

When passive protection projects deteriorate so they become a threat to safety of personnel and continued safe operation of plants, facilities, or installation, dangerous sections of the project will be dismantled.

a. LIMITATIONS. Dismantling will be limited to the minimum needed to restore safe conditions. Because of the general labor shortage, complete dismantling and inactivation of protective-concealment installations should not be undertaken. Parts of camouflage nets, dummy trees, poles, and similar items can be taken down. Types of work that will *not* be done at present without specific authorization from the Chief of Engineers are: removing texturing materials from paved surfaces; removing solidly fixed supporting guy poles and cables, and obliterating disruptive painting.

b. RESPONSIBILITY. At posts, camps, and stations, the post engineer will use Force Account labor to do any dismantling. At manufacturing plants and other installations the work will be done by maintenance crews, unless it is to the Government's best interests to have it done by contract. Before work is begun at class I, II, and IV installations, the service command engineer's approval will be obtained; his technical comments will be obtained for work at class III installations.

CHAPTER 4

UTILITIES

CHAPTER 4

UTILITIES

Section I. AIR CONDITIONING AND VENTILATION

4.1. Installation Policy in Continental United States

a. JUSTIFICATION. Air conditioning, cooling, or ventilation equipment will not be installed to increase efficiency of personnel or provide physical comfort. All installations must be justified by local conditions of temperature or humidity, health of personnel, functional requirements, and proper utilization of space. The system selected will be the simplest that will provide the required service. Evaporative coolers will be used only where climatic conditions make their use practicable. Duct work and equipment sizes will be kept to a minimum. Duct work will be nonmetallic wherever possible.

b. USE OF EXISTING INVENTORIES. Existing public and private inventories will be exhausted by using services before orders are placed which will result directly in new manufacture or fabrication.

c. INSTALLATIONS PERMITTED. The table below shows types of equipment allowed for specific uses in specific regions. Where air conditioning or evaporative cooling is permitted, mechanical ventilation will be substituted when satisfactory operating conditions can be attained.

Table I. Authorized uses for air conditioning and ventilation equipment.

SYMBOLS

AC—Air conditioning.

EC—Evaporative cooling.

MV—Mechanical ventilation.

X—No mechanical installation of any type allowed.

R—Regional hospitals only.

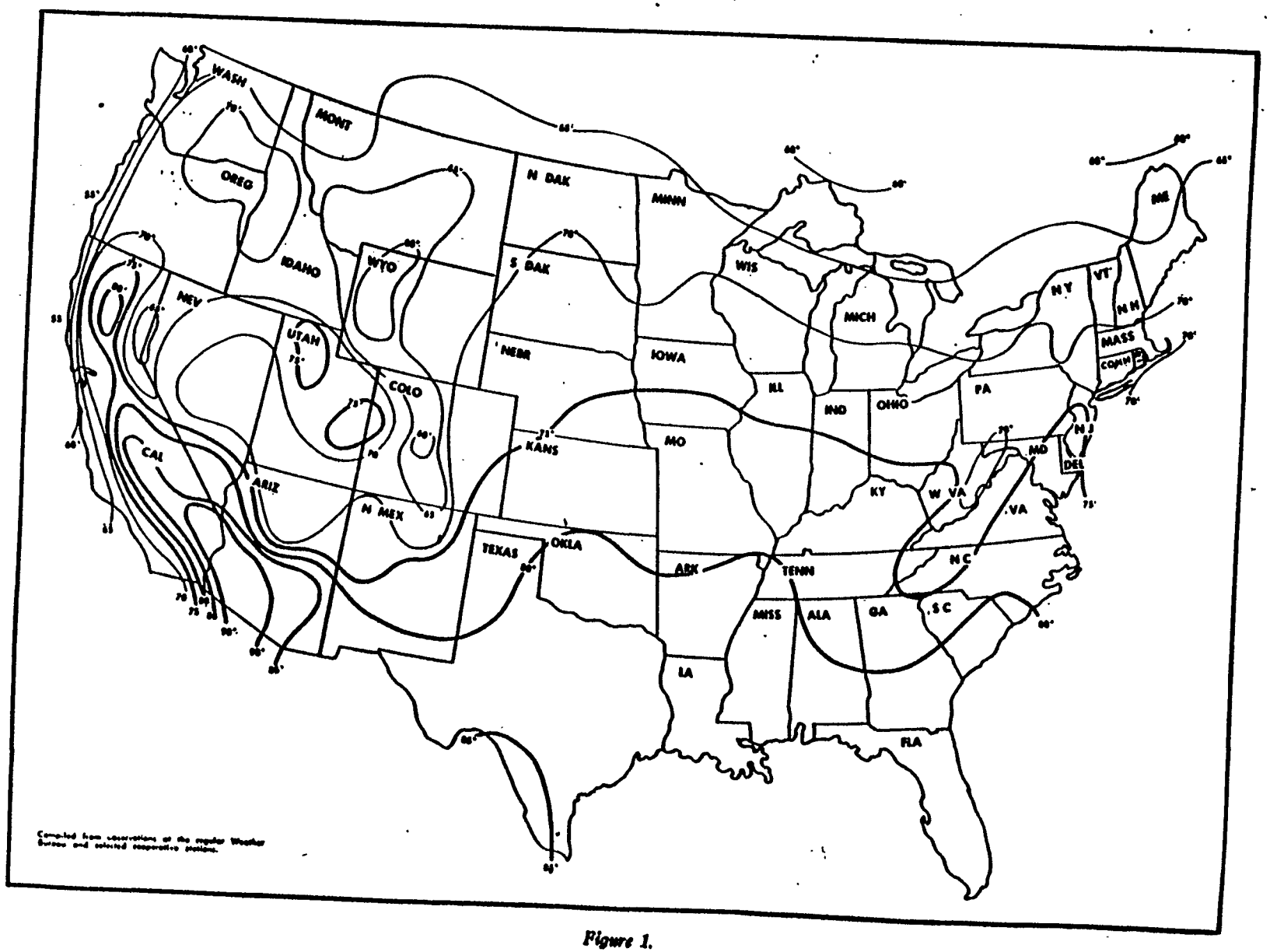

Figure 1.

Table I. *Authorized uses for air conditioning and ventilation equipment—Continued.*

Use	Regions as defined by isotherms on Weather Bureau map of normal July temperatures (fig. 1).			
	SW desert areas where temperature is 80° or more.	Areas where temperature is 80° or more (except SW desert area).	Between 80° and 75° isotherms.	Areas where temperature is less than 75°.
1	2	3	4	5
To control temperature and/or humidity essential for product processing.	AC	AC	AC	AC
To insure uniform charges for proof testing in gun and armor-plate plants.	AC	AC	AC	AC
To insure accuracy of fine machine work and in manufacturing, inspecting, adjusting, repairing, and storing precision instruments and optical elements.	AC	AC	AC	AC
To control atmosphere on conditions in celestial-navigation trainer and link-trainer spaces, jam-handy and instrument-trainer buildings, low-pressure chambers, and spaces housing synthetic training devices.	AC	AC	AC	AC
Main air-traffic control towers	EC	AC	AC	AC
Any of the 23 installations defined by AAF as flight control centers.	EC	AC	AC	MV
Underground fortifications in plotting and swichboard rooms, mine casemates, command posts, and seacoast battery service magazines.	AC	AC	AC	AC
Spaces required for processing and storing materials, for loading and unloading gun-camera film, and for storing gun-camera film and gun cameras in photographic laboratories and reproduction plants.	AC	AC	AC	AC
Evaluating or assessing rooms for reviewing gun camera films	EC	MV	X	X
Medical facilities:				
Hospitals:				
General hospitals:				
Surgeries	AC	AC	AC	AC
X-ray rooms and dark rooms	AC	AC	AC	MV
Recovery rooms	AC	AC	AC	AC
Dental clinics (including dental laboratories)	EC	AC	AC[2]	X
EEN&T clinics	EC	AC	AC	X
Clinics other than dental or EEN&T clinics (including infirmaries and receiving clinics).	EC	MV	MV[2]	X
Wards	EC	MV	MV[2]	X
Patient's mess halls	EC	MV	MV[2]	X
Duty personnel mess halls	EC	MV	MV[2]	X
Patient's recreation rooms	EC	MV	MV[2]	X
Post exchanges	EC	MV	MV[2]	X
Libraries	EC	MV	MV[2]	X
Administration buildings	EC	MV	MV[2]	X
Barracks and quarters	EC	MV	MV[2]	X
Regional hospitals:				
Surgeries	AC	AC	AC	AC
Recovery rooms	AC	AC	AC	AC
X-ray rooms and dark rooms	AC	AC	AC	MV
Dental clinics (including dental laboratories)	EC	AC	AC	X
EEN&T clinics	EC	AC	AC	X
Clinics other than dental or EEN&T clinics (including infirmaries and receiving clinics).	EC	MV	MV[2]	X
Flight surgeons clinics	EC	AC	AC[2]	MV
Wards	EC	MV	MV[2]	X
Patients' mess halls	EC	MV	MV[2]	X
Patients' recreation rooms	EC	MV	MV[2]	X

Use	Regions as defined by isotherms on Weather Bureau map of normal July temperatures (fig. 1).			
	SW desert areas where temperature is 80° or more.	Areas where temperature is 80° or more (except SW desert area).	Between 80° and 75° isotherms.	Areas where temperature is less than 75°.
1	2	3	4	5
Sleeping quarters for personnel whose duties require regular or intermittent periods of night work to the extent of one officers' quarters building, one nurses' quarters building, and one barracks building, or 10 percent of hospital personnel, at each hospital, whichever is greater.	EC	MV	MV[1]	X
Station hospitals:				
Surgeries	AC	AC	AC	X
X-ray rooms and dark rooms	AC	AC	AC	MV
Recovery rooms	AC	AC	AC	X
Dental clinics (including dental laboratories)	EC	AC	MV[1]	X
EEN&T clinics	EC	MV	MV[1]	X
Clinics other than dental or EEN&T clinics (including infirmaries and receiving clinics).	EC	MV	MV[1]	X
Flight surgeons clinics	EC	AC	AC[2]	MV
Wards	EC	MV	MV[1]	X
Patients' mess halls	EC	MV	MV[1]	X
Patients' recreation rooms	EC	MV	MV[1]	X
Sleeping quarters for personnel whose duties require regular or intermittent periods of night work to the extent of one officers' quarters building, one nurses' quarters building, and one barracks building, or 10 percent of hospital personnel, at each hospital, whichever is greater.	EC	MV	MV[1]	X
Other Medical Facilities:				
Flight surgeons' clinics	EC	AC	AC[2]	MV
Dental clinics (including dental laboratories)	EC	AC	MV[1]	X
Central dental laboratories	EC	AC	MV[1]	X
Service command laboratories and special laboratories	EC	AC	MV[1]	X
Dispensaries and infirmaries for minor operations	EC	MV	MV[1]	X
Sleeping quarters for nonhospital personnel whose duties require 1 week or more of night work at least once a month.	EC	X	X	X
Permanently blacked-out buildings without windows or with permanent closures which cannot be opened or removed for ventilation purposes.	EC	MV	X	X
Special-process spaces requiring more ventilation than gravity methods provide, because of nature of materials processed or production of dust, fumes, gases, or vapors injurious to health.	MV	MV	MV	MV
Dish-washing spaces	MV	MV	MV	MV

[1] Evaporative coolers *may* be installed where humidity makes their use practicable.
[2] Evaporative coolers *will* be installed where humidity makes their use practicable.

d. EXCEPTIONS. Exceptions will be made only when justified by reports containing the following information:

(1) Character, size, and use of space, and number of occupants.

(2) Maximum outdoor temperatures and length of time such temperatures prevail.

(3) For buildings in operation, maximum inside temperatures, seasonal duration of these temperatures, and the time personnel is exposed.

(4) Brief descriptions and sketches of desired installations, including number, location, size, and capacity of proposed equipment, and extent of electrical and duct work involved.

(5) Humidity conditions when applicable.

For repairs and utilities purposes, exceptions to table I will be processed for class I, II, and IV installations through the service command engineer and OCE to the Facilities and Inspection Branch, Production Division, Headquarters, ASF. Requests for exceptions for class III installations will be processed through the commanding general of the air force or AAF command and the Commanding General, AAF, to Facilities and Inspection Branch, Production Division, Headquarters, ASF.

4.2. Hospital Ventilation

a. GENERAL. Commanding generals of service commands, air forces, or AAF commands are authorized to approve installation of exhaust fans providing 60 air changes per hour for use in an hospital unit listed in paragraph 4.1*c*. Sixty air changes per hour are authorized in all general hospitals and in station hospitals which are of semipermanent, masonry type construction, one or two stories high.

b. VENTILATION FANS. Whenever practicable, fans will be purchased from manufacturers' inventories. Fans in service command inventories will be used for replacement and new installation in cantonment or theater of operations type construction station hospitals, industrial buildings, and all other permitted applications. Ventilation fans are limited-issue items of the Corps of Engineers. They may be purchased by the service command engineer or by post engineers on approval of the service command engineer for new installation or replacement.

Section II. ELECTRICAL SERVICES

4.3. Responsibility

Furnishing electrical services is the responsibility of the service or force responsible for repairs and utilities as prescribed in AR 100-80 and WD Circular 388, 1944. The term *electrical services* includes capacity and readiness to provide service as well as actually supplying electrical energy. Post commanders and post engineers are responsible that provisions of AR 100-90 relating to electric services are properly applied and enforced.

4.4. Army Air Forces

a. AAF SHOPS. By mutual agreement of the Chief of Engineers and the Commanding General, AAF, maintaining and operating permanently installed technical equipment in AAF shops is a responsibility of using agencies of the AAF. (See AR 100-80.)

b. FUNDS. Repairs and utilities funds will be used to pay all electric bills, including those for night lighting at installations other than those excepted in AR 100-80, and to pay power costs incidental to equipment installations at subdepots.

c. TECHNICAL AND NIGHT-LIGHTING EQUIPMENT. Maintenance and repair of airfield lighting facilities, including underground and overhead distribution systems, transformers, regulators, obstacle lights, runway marker lights, floodlights, wind-indicator lights, and controls, will be performed at AAF installations by the post engineer. Funds for maintenance, repair, alterations, and additions to airfield lighting systems will be provided from Air Corps, Army (ACA) project 424 funds for local procurement of miscellaneous material not supplied through central depots of the ATSC. Personnel performing such work on airfield lighting systems will be paid from ACA project 430 funds. Costs incurred by the post engineer from ACA project 424 and 430 funds will be reported under cost account 622-35, with a contra-debit under accounts 697-13, for payrolls and materials procured locally, and under account 699-20 for materials supplied AAF control depots.

d. STAND-BY ELECTRIC GENERATORS FOR AIRFIELDS. Stand-by electric generators will not be provided as an alternate power source for airdrome field lighting. Semiportable night-lighting sets are provided by AAF for emergency runway lighting in case regular power sources fail. Stand-by electric generators for airfield control towers are provided by the Army Airways Communcication System to operate their radio stations in case of preliminary power failure.

4.5. Signal Corps

a. COMMUNICATION SYSTEMS. The Signal Corps is responsible for design, procurement, installation, and maintenance of communication facilities and signal apparatus. Such facilities include public-address systems and interoffice and intraoffice voice-communicating systems. The Corps of Engineers is responsible for procurement, installation, and main-

multistory buildings, particularly those converted to a use requiring greater occupancy than originally intended. All pertinent information should be supplied to OCE, together with WPB Form 1236, for submission of a request to the Commanding General, ASF, for exemption from ANMB restrictions. Justifying information will include:

(1) Number of floors to be served.

(2) Number of occupants on floors above first.

(3) Estimate of time to be saved through installation of elevator service.

b. REPLACEMENT AND REPAIR. WPB approval must be obtained by OCE when replacement or repair of existing elevators is required. WPB Form 1236, together with complete information to justify the project, should be submitted to OCE.

c. MAINTENANCE CONTRACTS. The interests of the War Department are best served, particularly during wartime, by having full maintenance contracts for all elevators with the manufacturer or a reliable maintenance contractor.

d. FUNDS. Cost of elevator maintenance is chargeable to repairs and utilities funds.

e. MAINTENANCE BY POST ENGINEER. Where maintenance of elevators by the post engineer has been satisfactory, this type of maintenance will be continued.

f. MANUFACTURING PLANTS. The operating service is responsible for operating general passenger and industrial freight elevators at industrial sections of Government-owned and operated Chemical Warfare Service and Ordnance Department armories, arsenals, and proving grounds. For a list of facilities to which this policy applies, see paragraph 1.9.

4.9. Lamp Bulbs and Tubes

a. RESPONSIBILITY. Providing all incandescent and fluorescent lamp bulbs and tubes required for interior lighting at *all War Department installations* is a repairs and utilities responsibility.

b. PURCHASES. Purchasing and contracting is done by using the Treasury Department's General Schedule of Supplies, Electric Lamps. Repairs and utilities funds may be used.

c. SPECIAL LAMPS. The using service normally furnishes special lamps for technical equipment.

d. REORDERING. To conserve critical materials and determine the correct size to be issued, metal bases or unbroken bulbs should be turned in if possible when obtaining replacements.

4.10. Lighting Limitations

a. GENERAL. Usually, all lighting will be incandescent. Lighting for highway areas, industrial or production areas where mounting heights are over 24 feet, will be incandescent or a combination of incandescent and high-pressure mercury units (mercury H).

b. FLUORESCENT LIGHTING. Fluorescent lighting is prohibited except where deemed advantageous in production areas with fixtures mounted not higher than 24 feet above the floor, or where used as an alternate or in addition to incandescent lighting for exacting visual tasks such as the following:

(1) Assembly, inspection, and calibration of instruments or precision equipment.

(2) Operation of fine weaving and cutting machines.

(3) Precision-tool work and metal work of fine detail.

(4) Minute color, contour, or shade discrimination, or color matching.

(5) Floor drafting or similar work such as in lofts. This does *not* include architectural or mechanical drawing.

(6) Other factory production work with tools or machines where visual tasks are particularly exacting. This may include adjustment and repair of machines and inspections incident to manufacturing.

c. INCREASING LIGHT INTENSITY. Fluorescent lighting is permitted where existing generating capacities cannot provide sufficient incandescent lighting, and where it would be necessary to rewire the building or install new distribution transformers to provide sufficient incandescent lighting in buildings being converted, altered, or modernized.

d. EXCEPTIONS. Exceptions to ANMB restrictions in cases other than those outlined in *b* and *c* above, will be made by the Commanding General, ASF, on the basis of applications submitted through OCE. Applications for exemptions will include the following:

(1) Type of occupancy.

(2) Illumination intensities with existing facilities.

(3) Description of existing illumination facilities.

(4) Illumination intensities with proposed system.

(5) Description of proposed system.

(6) Type of structure and characteristics of spaces to be illuminated.

(7) Evidence of studies made of the possibility of using existing facilities.

(8) Pertinent remarks which may influence final decision.

4.11. Identification Lights

Special ruby identification lights for fire-reporting telephone systems and fire-alarm telegraph systems are not recommended at present. Suitable identification can be provided by one of two methods which are listed below in order of preference:

a. Installing fire-reporting boxes on poles carrying existing street lights, and painting, dipping, or otherwise identifying a suitable portion of the regular street-light bulb or globe.

b. Installing regular street-light fixtures on poles or supports carrying fire-reporting boxes and installing special identifying bulbs in these fixtures. Such lights should be connected directly to street-lighting circuits.

When the latter method is employed on series streetlighting circuits at high potential and lighting fixtures cannot be rendered reasonably inaccessible to inexperienced personnel, lights will be fed through an individual voltage-reducing transformer to reduce the potential hazard.

4.12. Transformers

WPB approval to place order with manufacturer is no longer required for transformers. Additional transformers should not be purchased unless the following conditions are met.

a. All existing transformers on the distribution systems have been checked to determine the feasibility of exchanging existing transformers and/or shifting loads to release transformers. This may eliminate the necessity for purchasing new transformers or may reduce the size of transformers to be purchased.

b. All distribution transformers are operating as nearly as practicable at the allowable temperature limits during the period of maximum demand. In general, transformers sized to approximately 56 percent of a connected intermittent load will not exceed allowable temperature limits. A greater diversity factor may be used where exact knowledge of connected-load characteristics clearly indicates that allowable temperature will not be exceeded.

c. If the load is continuous, the connected load does not exceed the transformers' rated capacity.

d. All surplus lists have been searched and efforts made to obtain the required transformers from surplus stocks of service commands, division engineers, depots, etc. Close liaison must be established with the service command and division engineer offices responsible for redistribution of excess property.

4.13. Miscellaneous

a. Vending or Amusement Machines. Electric power will not be supplied at Government expense for vending or amusement machines or other mechanical devices from which money accrues to private interests and business activities. Where electric power is furnished, the charge will be determined by the post engineer.

b. Electric Fans. For policy on electric fans, see paragraph 3.69.

c. Electric Organs. The Chief of Engineers is responsible for installing and moving electric organs and their power units at posts, camps, and stations. The Chief Signal Officer is responsible for inspection, maintenance, and repair of such organs, and for procurement, storage, and issue of spare parts.

4.14. Utility Wartime Aid Program

A program of cooperation arranged between the electrical utility companies and the War Department includes:

a. An engineering study of post electrical facilities to arrange operating procedures, increase efficiency, chesk loading of circuits and transformers, locate and salvage excess transformers or other equipment, conserve electric energy, and provide maps, one-line diagrams, etc.

b. Determination of critical power requirements in event of emergency.

c. An inventory of available reserve equipment, supplies, tools, and labor the utility company can supply in an emergency.

d. Liaison between the post engineer, serving utility, regional coordinator, and service command coordinator to plans for cooperation in an emergency.

e. Appointment of an electrical engineer from the serving utility to act as consultant to the post engineer.

Every assistance will be extended to the national coordinator, the regional coordinator, and representatives of the serving companies.

Section III. FUEL

4.15. Responsibility

a. COAL. The Chief of Engineers is responsible for specifications, determination of requirements, provision of funds, receipt, inspection and sampling, storage, issue, and distribution of coal, coke, and briquettes for utilities purposes in continental United States. The functions of receipt, inspection, sampling, storage, issue, and distribution are carried out by post engineers. The Quartermaster General is responsible for purchasing coal, coke, and briquettes. Only the Office of the Quartermaster General and coal purchasing depots are authorized to release information on coal purchasing policy. Neither the post engineer nor the service command engineer will communicate with the coal contractor unless requested by the coal purchasing depot.

b. EMERGENCY PURCHASE OF COAL. The service command engineer may authorize purchase of coal, coke, and briquettes to meet emergency needs. One copy of the purchase order must be submitted promptly to OCE, the Quartermaster General, and the appropriate coal purchasing depot.

c. LOCAL PURCHASES OF COAL REQUIREMENTS. (1) In accordance with an agreement between OCE and the Quartermaster General, commanding generals of service commands are authorized to approve the purchase of annual coal requirements of posts from funds available locally under the following conditions:

(*a*) Where the *total annual requirement* of blacksmith coal at the post is less than 20 tons.

(*b*) Where the *total annual requirement* of anthracite, bituminous, and/or sub-bituminous coal at the post is less than 45 tons.

(*c*) Where the *total annual requirement* of coke at the post is less than 20 tons.

(2) When coal is purchased locally under these conditions, it is not necessary to submit requisitions to OCE for approval before purchase is accomplished. Requisitions confirming all such local purchases will be submitted to OCE in duplicate. The confirming requisition will carry the following notation on the face:

> "The above requisitioned coal has been purchased locally. Annual requirements of (*insert type fuel*) estimated to be less than _____ tons. Do not duplicate."

d. GAS, INCLUDING LIQUEFIED PETROLEUM GAS. The post engineer at each installation is responsible for requirements, specifications, funds, purchase, inspection, storage, and distribution of natural and manufactured gas used for utilities purposes.

e. PETROLEUM PRODUCTS. The post engineer is responsible for determining requirements for petroleum products used for utilities at posts, camps, and stations, including outposts and separate detachments, in continental United States. The Quartermaster General is responsible for purchase, inspection, storage, issue, and distribution of petroleum products, containers, and drums. At station level, these functions are the responsibility of the post quartermaster. Post engineers will requisition liquid fuel (except liquefied petroleum gas) and lubricants for repairs and utilities from the post quartermaster or supply officer. Funds will not be cited on this requisition. The post engineer is responsible for maintenance and repair of permanently installed liquid fuel storage, handling, and dispensing equipment.

f. WOOD. The post engineer is responsible for specifications, determination of requirements, purchase, inspection, storage, issue, and distribution of wood and other solid fuels, such as charcoal, not purchased centrally through procurement directives issued by the Office of The Quartermaster General and used for utilities purposes in continental United States.

g. FUEL FOR EXPORT. For responsibility for fuel for export, see paragraph 4.16*d*.

4.16. Funds

a. COAL AND PETROLEUM PRODUCTS. Funds for coal, coke, briquettes, and petroleum products are made available by OCE directly to the Office of the Quartermaster General. However, where local purchase of coal, coke, and briquettes is authorized (pars. 4.15*b*, 4.15*c*, and 4.17) funds of the post engineer are used.

b. ALL OTHER FUELS. Funds for all other fuels are made available to the post engineer by the service command or AAF. Requisitions for these fuels are not required by OCE.

c. USE OF REPAIRS AND UTILITIES FUNDS TO PROVIDE HEATING FUEL. Repairs and utilities funds will be used only to purchase fuel needed to provide adequate heat in occupied buildings (not more than 72° during hours of active use). Purchase of supplemental fuel, such as wood for fireplaces, is not

properly charged against repairs and utilities funds. If facilities are inadequate, the most economical means of increasing the capacity with minimum use of critical materials will be determined.

d. PURCHASES FOR EXPORT. Fuel products for export are purchased under direction of the Quartermaster General. Funds for such products required for utilities purposes are made available by OCE directly to the Quartermaster General.

e. FUEL FOR TECHNICAL MILITARY ACTIVITIES. Fuel used for technical military activities, such as training and the operation of technical equipment in medical and dental clinics and laboratories, will be furnished from repairs and utilities funds without reimbursement.

4.17. Supply of Coal to Outposts and Other Separate Detachments

Wherever feasible, coal from the stock of the nearest established post will be used to supply outposts and other separate detachments at which length of stay or strength cannot be determined in advance. This method should be followed even where it is necessary to make a separate local contract for hauling coal from post to outpost. In such cases, the post engineer will include outpost requirements with the regular post requirements on annual or supplemental WD AGO Form 10-211, indicating under *Remarks* the tonnage to be used by the outpost. Where the above procedure is not feasible, local purchase may be made from funds available to the service command engineer. Such purchase should be held to a minimum. When an outpost must be supplied for an extended period of time and it is not feasible to supply coal from an established post, WD AGO Form 10-211 will be submitted through the service command engineer to OCE, as a request for the outpost's coal requirements. (See par. 4.20.)

4.18. Records of Fuel Consumption

The post engineer will maintain adequate records of fuel consumption so he can anticipate needs and determine operating cost and efficiency of plants and equipment. See TM 5-602 (when published) which outlines the approved method of maintaining such records. Post engineers will prepare a monthly inventory of solid fuels on Form QKF-48. Data shown on this report must reflect the fuel situation accurately.

4.19. Maintaining Adequate Coal Supplies

a. POST ENGINEER. The post engineer will maintain an adequate supply of coal on hand or under contract to meet post needs during the entire fiscal year. If extra coal is required, the post engineer will submit WD AGO Form 10-211 as soon as additional requirements are anticipated. At each post, responsibility for obtaining contractors' compliance with delivery schedules and/or delivery regulations of the Solid Fuels Administration for War and for supervising accurate records of coal in transit, receipts, issue, and stocks on hand (the daily coal situation) will be centralized in one person.

b. SERVICE COMMAND ENGINEER. The service command engineer's responsibilities for coal supply include:

(1) Having enough competent fuel service engineers on his staff.

(2) Using effectively the sampling personnel of the U. S. Bureau of Mines.

(3) Insuring that post and service command inventory and shipment records are accurate.

(4) Insuring that the post engineer as receiving officer rejects coal not suited to the equipment, not meeting OCE specifications, or not originating from mine indicated in purchase order.

(5) Insuring that provision is made for well-drained, properly surfaced, clean storage areas, reclaiming poorly stored coal, storing new tonnage carefully, and keeping sizes separated.

(6) Insuring that posts are maintaining and reconditioning coal-handling equipment and repairing coal bins.

(7) Insuring that fuel-yard personnel is well organized and trained and that supervision of receipt, inspection, sampling, unloading, storage, and delivery of coal is centralized in one qualified person.

(8) Insuring that provision is made for proper supervision of post requisitioning procedures.

(9) Insuring that coal is stored, handled, and distributed with a minimum loss through degradation.

4.20. Preparation of WD AGO Form 10-211

a. POST ENGINEER. The post engineer is responsible for preparation and submission of WD AGO Form 10-211. Annual requisitions will be submitted through the service command in time to reach OCE on the date specified yearly by OCE. Supplemental requisitions will be submitted as soon as additional coal requirements are anticipated and will cover additional requirements from the date of preparation to the end of the fiscal year.

b. INFORMATION REQUIRED. The kind and size of coal to be used and the type of equipment to be

ceived by transfer from (*name of station*) and is not to be purchased.

(3) OCE will be notified prior to transfer, sale, disposal, or declaration as surplus of coal in excess of 1,000 tons.

4.26. Surplus Coal

a. AUTHORITY. Commanding generals of service commands are authorized to declare as surplus to the War Department coal furnished for repairs and utilities purposes at class I, II, III, and IV installations. Repairs and utilities coal at discontinued posts, camps, and stations will be promptly transferred to an active installation or disposed of as surplus by commanding generals of service commands. Proper disposition will be made within 60 days of the discontinuance of any installation. (See par. 4.25.) In no case will coal be declared surplus and disposed of unless—

(1) A stock of coal exists which exceeds the estimated requirements of an installation for the current fiscal year and the first quarter of the succeding fiscal year.

(2) It has been determined in conjunction with the purchasing depot that the coal is not needed at other installations or that reloading and shipment to another station are not economically feasible. The purchasing depot is responsible for determining whether other coal purchasing depots or naval installations in the vicinity have need for the coal.

If the conditions outlined exist, the coal need not be listed on circularization lists before being declared surplus. Coal declared surplus under the above conditions will be disposed of in the manner provided by WD Procurement Regulation No. 7.

b. NOTIFICATIONS. Commanding generals of service commands will notify the Chief of Engineers and the Quartermaster General in turn, and the appropriate coal purchasing depot of the quantities of repairs and utilities coal disposed of or redistributed under these provisions.

4.27. Manufacturing Plants

For a list of facilities to which this policy applies, see paragraph 1.9.

a. FUNDS. Coal purchased locally and natural or manufactured gas for Ordnance Department and Chemical Warfare Service industrial armories, arsenals, and proving grounds are chargeable to funds available to the operating service. No reimbursement is made to the Ordnance Department from repairs and utilities funds for coal used for utilities purposes. Reimbursement is made to the Chemical Warfare Service from repairs and utilities funds for locally purchased coal for utilities purposes. Reimbursement is made to both the Ordnance Department and the Chemical Warfare Service from repairs and utilities funds for natural or manufactured gas for utilities.

b. REQUISITIONS. Coal requisitions for Ordnance Department and Chemical Warfare Service industrial armories, arsenals, and proving grounds will be prepared by an officer designated by the commanding officer of the establishment. They will be sent directly to the chief of the technical service concerned The Chief of Ordnance will forward all requisitions directly to the Office of the Quartermaster General for purchase. The Chief of the Chemical Warfare Service will approve the quantity of coal to be used for manufacturing purposes and forward the requisition to OCE for approval of the utilities coal. OCE will then transmit the requisition to the Quartermaster General for purchase.

4.28. Locomotives and Locomotive Cranes

Fuel for locomotives and locomotive cranes is chargeable to Transportation Corps funds. Submission of requisitions for coal is not the responsibility of the post engineer. Such requirements will not be included on WD AGO Form 20-211 but will be requisitioned by the transportation officer through Transportation Corps channels.

4.29. Coal-handling Equipment

The Chief of Engineers is responsible for specifications, determination of requirements, provision of funds, and purchase, inspection, storage, and issue of coal-handling equipment.

4.30. Permanently Installed Scales

a. TRUCK SCALES. Truck scales for weighing coal will be furnished to posts receiving shipments in excess of 10,000 tons per year by rail or 3,000 tons per year by truck unless all coal is consumed at one point, such as a general hospital. When special conditions warrant, posts receiving 5,000 to 10,000 tons of coal per year by rail may have a truck scale. Truck scales will be purchased locally from funds available to the post engineer.

b. RAILROAD TRACK SCALES. Railroad track scales will not be furnished to Army posts for weighing coal. Certified railroad weights will be accepted.

4.31. Coal Storage

a. CENTRAL COAL-STORAGE AREAS. A suitably graded, drained and surfaced central coal-storage area large enough for the maximum amount of coal to be stored will be provided where necessary. The general inactivation program will be considered in determining the size of this area. Bituminous material can be used to provide coal-storage areas.

b. COAL STORAGE AT POINT OF CONSUMPTION. Commanding generals of service commands, air forces, or AAF commands can approve use of open bins to replace coal boxes when such changes will result in more efficient operation. Necessary modifications in existing coal boxes may also be approved.

4.32. Railroad Trestles

Railroad trestles will not be installed at a post for coal delivery without specific authority from OCE.

4.33. Procedure Regarding Purchase of Coal

Coal which does not meet original OCE specifications will be purchased only on written waiver from OCE. The coal purchasing depot, assisted by the fuel service engineers and the Bureau of Mines coal sampler, will investigate where doubt exists as to the quality of the coal mined by a potential supplier. Representative analysis of the coal purchased will be shown on all contracts and purchase orders.

4.34. Purchase Orders, Delivery Orders, and Invoices

OCE does not require either the original or copies of purchase orders, delivery orders, or invoices for petroleum products, natural and manufactured gas, coal, or any other supplies or equipment purchased locally, except for emergency purchases of coal which must be confirmed by a copy of the purchase order as outlined in paragraph 4.15*b*.

4.35. Receiving Reports

Receiving reports are to be executed as provided for in AR 35-6560 within 3 days after the date of delivery and acceptance at destination. Receiving reports will be prepared and distributed to the purchasing depot in the manner and as prescribed by the depot. Additional copies will be prepared and distributed as required by the chiefs of the technical services.

a. WHEN SAMPLED. In cases where shipments are sampled, the appropriate one of the following notations will be made upon receiving reports to indicate by whom the sample was taken:

(1) The coal covered by this receiving report has been sampled by or under the immediate supervision of a representative of the United States Bureau of Mines.

(2) The coal covered by this receiving report has been sampled by or under the immediate supervision of the fuel service engineer.

(3) The coal covered by this receiving report has been sampled by post personnel.

b. WHEN NOT SAMPLED. In cases where shipments are not sampled, the following notation will be made on receiving reports: The coal covered by this receiving report has not been sampled.

c. GUARANTEED ANALYSIS CONTRACTS. Receiving reports covering coal shipped pursuant to guaranteed analysis contracts will be prominently marked with the notation: GUARANTEED ANALYSIS CONTRACT.

4.36. Inspection and Sampling

a. INSPECTION. The post engineer, a commissioned assistant, or a qualified civilian assistant will visually inspect coal, coke, and briquettes for utilities purposes to determine that it is the grade and size contracted for, and that it is reasonably free from bone, slate, and other foreign matter. Shipments found to be definitely substandard as to size, preparation, or purity will be rejected. Communications regarding rejections will be sent by the post engineer through the service command engineer to the appropriate coal purchasing depot which will notify the contractor to remove the coal from the reservation. Usable substandard coal may be accepted, subject to price adjustment made by the appropriate purchasing depot based upon recommendation of the service command fuel service engineer.

b. SAMPLING. Initial shipments on contracts for 500 or more tons of coal, coke, or briquettes will be sampled at the destination and subsequent samples will be taken of each additional 5,000 tons delivered. Samples on contracts amounting to less than 500 tons may be taken on trial shipments or where the analytical information is desired. Where analysis or use of coal, coke, or briquettes indicates substandard quality, succeeding shipments will be sampled continuously until they meet specifications or until a request is made for contract cancelation. The following procedures apply to sampling:

(1) Coal may be inspected or sampled at the mines or the shipping point instead of at destination if it is more efficient or if requested by a coal purchasing depot which is in doubt as to the quality

produced by the supplier. Inspection and sampling done at the mines should be coordinated through the depots' purchasing and contracting officers.

(2) Bureau of Mines coal samplers assigned to each service command will be utilized by service command engineers where there is any question as to the contractor's ability to meet specifications or the guaranteed analysis, or where difficulties are being experienced in the use of coal, coke, or briquettes. Samples taken under Bureau of Mines supervision will be numbered serially for each contract with the letters MU added, as *Sample No. 1—MU.*

(3) Samples taken by the fuel service engineer or the post engineers' fuel-handling personnel will be numbered serially for each contract with the letter U added, as *Sample No. 1—U.*

(4) The form that accompanies the samples submitted to the Bureau of Mines for analysis will show whether the sample is being taken for routine or special purposes. If taken for special purposes, the reason will be shown as trial shipment, for information, or continuous sampling account of doubtful quality.

(5) Neither the post engineer nor the service command engineer will communicate directly with coal purchasing depots regarding analysis reports unless the coal contracting officer requests information on trial shipments.

(6) Communications regarding receipt, inspection, and sampling procedure will be directed by the post engineer to the service command engineer for indorsement to OCE. Reports of investigations covering improper sampling may be forwarded directly to the Bureau of Mines by the service command engineer.

(7) When analysis reports indicate the need for corrective action, the post engineer will submit a request through the service command to OCE and the Office of the Quartermaster General for action by the appropriate coal purchasing depot. Corrective action will be initiated when two successive shipments from the same mine to one or more posts show the coal to exceed the ash specifications by 3 percent or to fall below the Btu specification by 3 percent. Corrective action also may be initiated under other justifiable conditions. Where corrective action is based on successive shipments to more than one post, action will be initiated by the service command.

(8) Service commands will permit Bureau of Mines coal samplers to sample for the Ordnance Department, the Chemical Warfare Service, and the Transportation Corps upon specific requests to the service command engineers by the using services. Samples so collected will be numbered serially for each contract followed by the letters ORD for Ordnance Department, CWS for Chemical Warfare Service, and TC for Transportation Corps, as *Sample No. 1—TC.*

4.37. Restrictions on Use of Fuels

a. LIMITATIONS. To meet fuel shortages, governmental limitation orders have been invoked to control the sale and use of fuel oil, natural and manufactured gas, and liquefied petroleum. Except as replacements, equipment using oil, gas, or electricity as fuel will not be procured until fuel clearance has been obtained by OCE.

b. RESTRICTIVE ORDERS. The orders and their applications follow:

(1) *L-56.* Use of fuel oil is restricted in the greater part of continental United States to installations specifically approved in advance by the Petroleum Administrator for War.

(2) *U-7.* Where OCE has authorized natural or mixed gas, WPB Form 3314 will be filed jointly by the post engineer and the local utility with the Office of War Utilities, WPB, Washington, D. C., if the gas is to be used in certain areas indicated in Limitation Order U-7.

(3) *L-174.* Where OCE has authorized manufactured gas, WPB Form 3138 will be filed jointly by the post engineer and the local utility with the Office of War Utilities, WPB, Washington, D. C., if the gas is to be used in certain areas indicated in Limitation Order L-174.

(4) *L-86.* Where OCE has authorized liquefied petroleum, WPB Form 809 will be filed by the supplier with the Liquefied Petroleum Unit, Plumbing and Heating Division, WPB, Washington, D. C. This form will be employed for both fuel and equipment.

c. COAL TONNAGES. Coal is not subject to restrictive orders, but tonnages must be cleared by the Fuels and Lubricants Division, Office of the Quartermaster General, with the Office of Solid Fuel Administration for War. Therefore, use of appreciable tonnages of coal for new or additional installations must be approved by OCE.

Section IV. HEATING

4.38. Conservation of Fuel

a. MEASURES. The following measures have been approved by the Surgeon General and will be enforced to reduce fuel consumption:

(1) Prevent overheating of buildings, using temperature-control equipment when available. If there is no automatic temperature control, regulate the heat source to conform to outdoor weather conditions by operating firing devices or distribution-line valves manually. Sleeping quarters or other spaces not actively used at night will not be heated to temperatures above 55°.

(2) Keep windows and doors of cantonment and theater of operations buildings closed during heating seasons except under the following circumstances, where thermostats will be placed on the lowest settings:

(*a*) During sleeping hours.

(*b*) During short periods not over 30 minutes to ventilate excessive dust, such as that caused by sweeping.

(*c*) Special ventilation ordered by a medical officer instead of or after fumigation or sterilization against contagious disease.

(*d*) When outside temperature is 65° F. or higher.

b. FUEL-CONSUMPTION CONTROL. The post engineer will report any instances of excessive fuel consumption resulting from neglect, carelessness, intentional waste, or unnecessary operation of heating equipment to the post commander.

4.39. Operating Personnel for Heating and Boiler Plants

a. INTENT OF POLICY. The intent of this policy is to provide civilian operators for all large heating plants and civilian firemen for small heating plants where their services will release military personnel for field duty or will prevent serious interference with training. (See *d*, *e*, and *f* below.)

b. EXTENT OF COVERAGE. This policy will govern employment of operating personnel for heating and boiler plants at all installations at which repairs and utilities are accomplished in accordance with AR 100-80. It will not apply to Ordnance Department and Chemical Warfare Service plants, arsenals, and proving grounds, where operation, maintenance, and repair of boiler plants are the responsibility of the respective technical services by agreement with the Chief of Engineers, pursuant to AR 100-80.

c. FUNDS. Repairs and utilities funds will be used to pay civilians employed under this policy by the War Department to fire heating plants, boiler plants, and space heaters.

d. WHERE CIVILIAN PERSONNEL WILL BE USED. Civilian personnel will be employed to operate—

(1) All heating and boiler plants having a total rated capacity of more than 100 horsepower (hp) or equivalent Btu rating.

(2) Heating and boiler plants having a total rated capacity of less than 100 hp or equivalent Btu rating, and individual stoves and heaters only for—

(*a*) Special facilities such as AAF, ASF, or AGF technical or factory schools, laboratories, War Department theaters, and post offices on a post. Where the facility is part of the post, firemen will be provided only for the excepted facility unless otherwise provided below.

(*b*) Dormitory type civilian quarters and community buildings under War Department jurisdiction.

e. WHERE CIVILIAN PERSONNEL MAY BE USED. Upon service command or AAF command approval, civilian personnel may be employed to operate heating and boiler plants in—

(1) Warehouses. When possible, however, personnel engaged in regular warehouse and depot operation will be utilized.

(2) Post administrative headquarters where no station complement is available. Regularly assigned operating or custodial personnel will, however, be utilized as much as possible.

(3) Buildings occupied by patients at reconditioning centers. Use of patients to fire heating plants is not in accord with the policy of the Office of the Surgeon General.

f. WHERE CIVILIAN PERSONNEL WILL NOT BE USED. Civilian personnel will *not* be employed to operate heating and boiler plants in—

(1) Organizational buildings, such as barracks, quarters, day rooms, administration buildings, mess halls, bathhouses, and lavatories. These facilities will be fired by the field force unit or station complement to which the buildings are assigned.

(2) Buildings where personnel are present and available, such as fire stations, small warehouses, guardhouses, and garages.

(3) All officers' and noncommissioned officers' quarters. If civilian firemen are used in these facilities, they will be paid by the occupants.

(4) Residential type civilian quarters.

(5) Profit-making organizations such as service clubs, post exchanges, and officers' clubs, and welfare agencies such as Red Cross and YMCA. If civilian firemen are used in these facilities they will be paid by the using agency.

g. CONSTANT ATTENDANCE NOT REQUIRED. Regardless of operating pressures, boilers do not require constant attendance unless in a plant larger than 100 hp or inadequately protected by safety devices or controls.

h. SOLDIER FIREMEN. Enlisted personnel may be assigned to fire furnaces in categories listed in *e*, *f*(1), and *f*(2) above, provided they have been trained by the post engineer at facilities which he provides. When practical, firemen should be assigned for at least 30 days.

4.40. General Mechanics, Heating

General mechanics, heating, will be assigned to inspect and repair small heating plants and to instruct firemen.

4.41. Combustion Engineers

a. SERVICE COMMAND COMBUSTION ENGINEERS. Service commands will coordinate and direct the activities of the combustion engineers to obtain maximum effectiveness in training and assisting post personnel and insuring proper utilization of the fuel supply. Combustion engineers are responsible for determining whether established heating procedures are being followed. Duties of the combustion engineers will be as follows:

(1) Periodically visiting posts in accordance with existing regulations to give technical assistance to post personnel on all phases of operation and maintenance of heating equipment.

(2) Assist in training post personnel in proper practices and procedures for operating heating equipment.

(3) Ascertaining that administrative control and personnel for operating and maintaining heating plants are properly instructed in their duties.

(4) Assisting post engineer personnel in establishing maintenance programs and training courses.

(5) Inspecting heating equipment, reviewing operating practices, and making recommendations as required.

b. USE OF INDUSTRIAL COMBUSTION ENGINEERS. Since personnel is limited both in service commands and posts, combustion engineers of Bituminous Coal Research, Inc., and Anthracite Industries, Inc., may be used to assist service command and post engineers.

4.42. Service by Local Utility

To reduce gas consumption at camps, posts, and stations, the gas supplier will be requested in writing to inspect and report on the following services:

a. Adequacy of post distribution facilities; need for further looping of systems to decrease pressure drop; and materials needed for sectionalizing distribution facilities to repair leaks in mains.

b. Operating condition of gas-burning equipment, including regulators, piping, controls, and air-gas mixtures.

c. Flue-gas analysis of larger installations, including wherever practicable those using fuels other than gas.

4.43. Temperature-control Equipment

a. BUILDINGS SERVED FROM CENTRAL PLANT. Automatic space temperature-control equipment is essential to efficient operation of heating systems and conservation of fuel. The following policy governs installation of temperature-control equipment in existing buildings in hospital areas or others served from a central plant:

(1) Quarters and general-purpose buildings will be grouped where practicable and equipped with controls actuated by outside temperatures.

(2) Storehouses and similar buildings will be controlled by individual outside thermostats.

(3) Wards and clinical buildings will be controlled either by inside thermostats or outside temperature. Where wide variations in temperature or building construction make outside control more desirable, the possibility of using them will be carefully checked with the post surgeon.

b. AMORTIZATION OF COST. Temperature-control equipment will be installed only where cost, including material and labor for the complete installation plus estimated maintenance cost for 2 years, can be amortized in 2 years. (Estimate a 15 percent saving of total plant fuel consumption by use of temperature-control equipment.)

4.44. Procurement of Kitchen Ranges and Heating Equipment

a. KITCHEN RANGES. Kitchen ranges will be supplied through Quartermaster channels.

b. ARMY NO. 1 SPACE HEATERS. Army No. 1 space heaters and economizers will be requisitioned from service command engineer.

c. REPAIR PARTS. Repair parts for the following will be requisitioned from the service command engineer: Nos. 15, 18, and 20 Cannon stoves; Army No. 1 space heaters; and until present stocks are exhausted, United States laundry stoves Nos. 12 and 14. Repair parts for other heating equipment will be procured locally.

d. BOILERS AND FURNACES. Boilers and furnaces for space heating, hot-water heating, and utility steam generation will be purchased locally.

e. OIL, GAS, OR ELECTRIC HEATING EQUIPMENT. Oil, gas, or electric heating equipment will be procured only when use of the fuel has been authorized by the responsible Government agency, unless the equipment will replace similar equipment which uses the same fuel. Requests for fuel authorization will be cleared through the service command engineer to the OCE.

f. STOCKING OF PARTS. The post will stock an adequate supply of parts not stocked in the division engineer's warehouse. Stocks should not exceed minimum requirements; normally the following will be adequate:

Grate bars	2.5% of total installed
Firebrick	2.5% of total installed
Door castings	1.25% of total installed
Controls	2.5% of total installed
Other parts	25% of annual replacement.

g. CONTROL INSTRUMENTS. Generally controls will be repaired by replacing them from stock and returning damaged units to the manufacturer for exchange or repair. Field repairs on controls are generally unsatisfactory.

4.45. Boiler Equipment

a. BOILER TRIM. The arrangement and design of all boilers, boiler fittings, and appliances such as safety valves, stop valves, blowoff piping, feed piping, and water column piping will conform to the ASME Boiler Construction Code. Duplicate feedwater systems, special blowdown valves, safety-valve relieving gear, and similar appliances not required by the ASME Code will not be installed without OCE approval.

b. FIRING EQUIPMENT. Firing equipment will be designed to provide sufficient capacity to operate fire-tube boilers at 125 percent of mechanically fired Steam Heating Boiler Institute (SHBI) rating and water-tube boilers at 200 percent of ASME rating.

4.46. Boiler Plant Performance

a. CENTRAL HEATING PLANT LOGS. All central heating plants will keep an operating log available at all times for review by post engineers or service command combustion engineers. This log will contain all pertinent information on operation and maintenance of the plant. It will indicate major maintenance projects and will contain a daily operating record, including fuel consumption and steam produced, boiler outage schedules, and cleaning and repair periods.

b. BOILER EFFICIENCY. Under average conditions, no less than 10 percent carbon dioxide for coal- and oil-burning installations and 8 percent for gas-burning installations will be maintained. Coal-burning installations having instruments and automatic combustion control will, however, operate at 12 to 13 percent carbon dioxide. All damper controls must be properly regulated to insure minimum use of excess air. Rate of fuel consumption will be carefully adjusted to meet load requirements. Boiler tubes and flues will be kept clean to insure maximum heat transfer.

c. UTILIZATION OF WASTE STEAM. Excessive venting of exhaust steam from flash tanks and back-pressure valves will be eliminated. High-pressure traps will be inspected regularly for proper operation. Exhaust steam from auxiliaries, flash tanks, and other sources will be connected through safety devices to low-pressure steam mains for space and hot-water heating.

d. INSULATION OF DISTRIBUTION SYSTEMS. Radiation caused by poorly insulated surfaces will be eliminated, particularly in underground piping. Precautions will be taken to prevent flooding of underground pipe tunnels and conduits. Should flooding occur, conduits will be drained at once. Damaged pipe covering will be repaired or replaced wherever possible.

4.47. Boiler-water Treatment

a. BUREAU OF MINES TREATMENT. Army installations at which repairs and utilities responsibilities are performed in accordance with AR 100-80 will use the boiler-water treatment recommended by the Bureau of Mines and follow instructions outlined in TM 5-650 (when published). If other stations use the Bureau of Mines treatment, they will comply with established procedure. Engineers in OCE and service commands will assist them on request.

b. EXCEPTIONS. High-pressure steel boilers of less than 10 hp will receive boiler feed-water treatment only when the service command considers it necessary. To protect *low-pressure* boilers with minimum attention, responsibility for preventive maintenance is delegated to the service command engineer; where needed, he will require treatment and submission of samples to the Bureau of Mines according to the procedure in TM 5-650.

c. TRADE-NAME COMPOUNDS AND PRIVATE CONTRACTS. (1) Use of trade-name compounds and contracts for private handling of boiler-water treatment are not authorized. On approval of the service command, exceptions will be authorized when additional treatment is required to meet a special condition. (See TM 5-650.)

(2) Coravol will be used only with approval of the service command. The Surgeon General authorizes its use where steam comes in direct contact with food only if Coravol is *never* added to the boilers within 1 hour of the use of direct-contact steam cookers. Where Coravol is used, precautions will be taken to comply with this requirement.

d. SERVICE COMMAND BOILER-WATER ENGINEER. The service command boiler-water engineer is responsible for—

(1) Determining whether established directives on boiler-water treatment given in TM 5-650 are being followed.

(2) Recommending treatment at posts to maintain recommended chemical limits.

(3) Helping train post personnel in the proper use and handling of the chemicals.

(4) Providing post personnel with technical assistance in operating and maintaining all water softeners except those for the post water supply.

e. BOILER-WATER HYDROMETERS. Broken boiler-water "Pacometer" hydrometers will be replaced by sending them *complete with leather case* to: The Permutit Company, 330 West 42d Street, New York (18), New York. The purchase order to the Permutit Company will be for $15 and will supply a minimum priority rating at AA-5. The service command boiler-water engineer will assist the posts where calibration of hydrometers is the only defect. Hydrometers will not be shipped to the Bureau of Mines for repair or calibration.

4.48. Improvements to Boiler and Heating Plants

Coal conveyers and soot blowers will be provided wherever the labor saved warrants their installation. Soot blowers should also be installed where removing boilers from service to clean tubes interfers with operation.

4.49. Boiler-feed-equipment Requirements

Specifications governing 700- and 800-series laundry and hospital boiler houses call for installation of two boiler-feed pumps, each pump having enough capacity to meet the plant's maximum load requirements. Since all installations made in accordance with these specifications provide a spare pump, they comply with the ASME Code. Therefore, additional boiler-feed equipment, such as injectors, is unnecessary. In plants not equipped with feed-water heaters but equipped with both electric- and steam-driven boiler-feed pumps, the steam-driven pump should be used only in emergencies or during necessary shutdowns of the electric-driven equipment, since no facilities are available for using exhaust steam.

4.50. Spare Boiler-plant Capacity

a. POLICY. The following policy will determine need for additional boiler capacity. This policy provides a margin of safety for emergency conditions while eliminating unnecessary stand-by boiler equipment.

(1) Plants containing water-tube boilers will be considered satisfactory when maximum load can be carried with all boilers operating at 150 percent of rating.

(2) Plants containing steel fire-tube boilers will be considered satisfactory when maximum load can be carried with all boilers operating at normal rating.

(3) Plants containing cast-iron boilers will be considered satisfactory when maximum load can be carried with all boilers operating at normal rating.

b. ADDITIONAL BOILERS. When necessary, additional boilers will be provided to meet the above conditions.

c. LOAD DETERMINATION. The following may be used to compute load determination on heating plants where flow meters or other test data are not available:

(1) Heating load is totaled and its steam demand on the heating plant determined using 100 percent load factor.

(2) Utility steam such as for domestic hot-water sterilizing, and kitchen equipment is assumed to have a load factor of 65 percent.

(3) In determining total demand on hospital plants, line loss is taken at 21 percent of total con-

nected load. This includes line loss for the distribution system and for the various buildings.

(4) Demand due to pick-up is taken as zero, on the basis that steam is always on the system.

(5) On laundry-boiler plants, steam demand may be taken as 100 percent of the total connected load with no allowance for pick-up on line loss.

d. APPLICATION. The above policy will be followed only for additions or replacements at installations where repairs and utilities responsibilities are performed in accordance with AR 100-80. It does not apply to new construction projects or to Ordnance Department and Chemical Warfare Service plants, arsenals, and proving grounds where operation, maintenance, and repair of boiler plants are responsibilities of the respective technical services.

4.51. Instruments for Boiler Plants

The following recommendations will guide the selection of boiler-plant instruments; modifications may be made to suit individual conditions.

a. COMMON TO ALL BOILERS. (1) *Steam-flow meters.* A steam-flow meter should be installed on each 300 hp and larger boiler or on the main header from a group of boilers totaling 300 hp and larger where individual meters are not used. Flow meters should not be used on main headers unless the cost of necessary piping changes is moderate. A steam-pressure recorder to record pressure in main headers should be combined with one of the flow meters.

(2) *Steam-flow air-flow meters.* For 300-hp or larger boilers, a steam-flow air-flow meter may be installed in place of a steam-flow meter and carbon dioxide recorder.

(3) *Temperature recorders.* One combination carbon dioxide and flue-gas temperature recorder should be installed for each 300-hp or larger boiler. When individual recorders are not used, one carbon dioxide recorder connected by a manifold to each boiler of a group totaling 450 hp or larger should be installed. Flue-gas temperature recorders on breechings common to several boilers are of limited value. To obtain the temperature of flue gas leaving a group of boilers not having individual carbon dioxide and flue-gas temperature recorders or steam-flow air-flow meters, a thermocouple for the last pass of each boiler, one selector switch, and one indicating type pyrometer may be installed.

(4) *Flue-gas analysis set.* At least one portable flue-gas analysis set should be available on each post to determine carbon dioxide on miscellaneous boiler units and to check recording equipment.

b. COAL-FIRED BOILERS. Draft gauges should be installed on 100-hp and larger boilers, and automatic draft controls should be installed on 150-hp and larger boilers.

c. OIL- AND GAS-FIRED BOILERS. (1) *Flue-gas analysis set.* One portable flue-gas analysis set should be available per boiler room of 150- to 450-hp capacity.

(2) *Draft gauges.* Draft gauges should be installed on all 50-hp and larger boilers. Automatic controls should be installed for primary and secondary air for oil-burning equipment using No. 5 or No. 6 oil. For installations using lighter oils, chimney draft should be regulated by barometric type balanced dampers.

(3) *Gas meters.* Gas meters should be installed on boiler plants having steam-flow meters.

4.52. Boiler Inspection

Boiler inspections required by AR 850-300 will be performed by an inspection agency approved by OCE. Inspections should be spread out over the entire year as much as possible to equalize the work load and make it possible to use one inspector in the same area all the time. Inspections will usually be both internal and external, followed or preceded by an external inspection under steam pressure. Boilers in questionable condition or those over 5 years old will be given an internal and external inspection followed or preceded by an external inspection while under hydrostatic test. To simplify inspection procedure for other establishments, service commands will coordinate inspections at Army installations at which repairs and utilities responsibilities are performed in accordance with AR 100-80. Post commanders at such stations are authorized to request the service command engineer directly for services of these inspectors. Rendering this service at such stations will not be construed to place any responsibility for operation or maintenance on the service command engineer. Inspections on locomotives and locomotive cranes will be handled by the Transportation Corps.

4.53. Stoker Equipment

Stokers may be installed under any boiler or furnace provided savings in labor and fuel will amortize the total cost of installation within 2 years. When the use of stokers is authorized, they will have enough capacity to operate fire-tube boilers at 125 per cent of SHBI mechanically fired rating and water-tube boilers at 200 per cent of ASME rating.

4.54. Economizers for Army No. 1 Space Heater

Economizers for Army No. 1 space heaters will be requisitioned from the service command engineer. Economizers increase the output of the Army No. 1 space heater from 33,000 Btu per hour to more than 50,000 Btu per hour and will be added to Army No. 1 space heaters in any inadequately heated buildings.

4.55. Hot-water Building Heating Systems

Hot-water building heating systems will have proper controls and relief valves to prevent overheating.

4.56. Furnace-fan Operation in Summer

Circulating fans on forced warm-air systems not in heating service during the summer months will be adjusted so they cannot be operated during these months except in theaters and similar buildings designed for summer ventilation.

4.57. Automatic Controls for Black-out Areas

Automatic controls for domestic-sized, coal-burning heating equipment which would not operate during black-outs because of power failure will not be replaced by manual controls unless blackouts are a matter of nightly routine.

4.58. Air Filters

Except in extremely dusty areas, filters in the return-air plenum of forced-circulation heaters are of no practical value in conserving health. Upon concurrence of the post surgeon, the use of filters will be discontinued wherever possible.

4.59. Accessories for Small Heating Plants

Coal hods and bags, shovels, pokers, and ash hoes will be requisitioned from the service command engineer.

4.60. Heating in Hospital Corridors

Connetcting corridors in hospitals in areas having more than 2,500° days will be heated to 55° F. Connecting corridors in areas having less than 2,500° days will not be heated except in cases of unusual exposure. Where freezing temperatures may occur at any time and no heat is provided, sprinkler piping in corridors will be protected by 1½-inch to 3-inch valved steam lines running parallel and close to sprinkler lines. Corridor space inside hospital buildings may be heated.

4.61. Operation and Maintenance of Laundry Facilities

a. POST ENGINEER. The post engineer is responsible for:

(1) Maintaining and operating laundry boiler plants.

(2) Maintaining steam-distribution lines, traps, etc., in the laundry building, up to the connection entering the laundry machine and beyond the connection leaving the machine.

(3) Operating, providing operating supplies, adding to, and servicing water softeners and water heaters for laundry purposes, wherever installed.

(4) Maintaining electric power lines in the laundry up to the machine, including replacement of fuses and maintenance of circuit breakers.

(5) Maintaining and repairing all water lines, valves, faucets, etc., in the laundry, up to the control valves on the laundry machines.

(6) Maintaining all drains, sewers, and traps serving the laundry.

b. POST LAUNDRY OFFICER. The post laundry officer is responsible for:

(1) Maintaining laundry machines.

(2) Maintaining motors and other electrical equipment on the machine side of the fuse box or circuit breakers.

(3) Maintaining control valves and other water-supply equipment on the machine side of the control valves.

c. REPAIRS. Under the combined shop loan, post engineer maintenance shops and utilities personnel may be used to repair equipment for which the post supply and service officer is responsible.

d. STEAM PRESSURE IN LAUNDRY BOILER PLANTS. For efficient operation, minimum steam pressure of 100 psi will be maintained at the equipment in laundry boiler plants. Laundry boilers will be operated at enough pressure above 100 psi to compensate for pressure losses between boilers and laundry equipment; however, the maximum safe working pressure of the boiler approved by the boiler inspector must not be exceeded.

4.62. Warehouse Heating

a. WHEN AUTHORIZED. Warehouse heating wil be authorized where required by operations performed in them or to protect perishable materia against freezing. However, before heating facilitie are requested between fire walls in any warehous

section, the using service will submit evidence to the post engineer to show that operations in each section cannot be performed in other sections which are already heated or for which heating is proposed.

b. DEGREE OF HEATING. Although the percentage of warehouse space which may be heated is not limited, every effort will be made to follow the recommendations below so heated areas will be at a minimum. Maximum temperatures are as follows:

(1) 70° F. for all office space, toilet rooms, and areas where many employees work seated or standing on jobs involving little exercise.

(2) 55° F. for sections where many employees work entirely inside, standing and exercising moderately; such work includes sorting, collecting into and from bins, etc.

(3) 40° F. for sections where employees do work involving considerable exercise, such as packing, crating, and stacking, or where heat is required to protect material from freezing.

(4) No heating will be permitted in sections which do not contain material requiring protection from freezing, and where the only operations are placing and withdrawing stored goods.

c. JUSTIFICATION. Requests for heating facilities will include complete justification as follows:

(1) Complete outline of present and proposed heating facilities.

(2) Description of operations performed in all warehouse space for which additional heating facilities is requested.

(3) Maximum, minimum, and average outside temperature for winter season for past 5 years taken from Weather Bureau records.

(4) Floor-plan sketch of all warehouse facilities showing areas and number of employees as follows:

(*a*) Number working seated with minimum exercise, such as office work, or standing with little exercise, such as filing.

(*b*) Number standing with moderate exercise, such as sorting or working at assembly tables, bins, etc.

(*c*) Number standing with considerable exercise, such as packing, crating, boxing, stacking, and loading.

(*d*) Storage areas where employees are present only occasionally.

d. SCREENING OF REQUESTS. Requests for additional heating will be screened with extreme caution, and no requests will be considered if other means can be used. Questions on proper use of warehouse space at posts, camps, and stations will be referred to the appropriate service command for review and recommendation by the technical service representative; those involving class IV installations will be referred to the office of the chief of technical service for review and recommendation.

4.63. Manufacturing Plants

At industrial sections of Government-owned and operated Chemical Warfare and Ordnance Department armories, arsenals, and proving grounds, maintenance, repair, and operation of gas generating plants, inside gas-distribution systems (except those used for heating, cooking, and lighting), and boiler-plant and steam-distribution systems are an operating service responsibility. Maintenance, repair, and operation of outside gas-distributing systems at these installations are a repairs and utilities responsibility. Mechanical engineers in OCE and in the service command engineer's office will be available on request to assist in problems of operation and maintenance. For a list of facilities to which this policy applies, see paragraph 1.9.

Section V. REFRIGERATION

4.64. Refrigerated Warehouse Facilities

a. STORAGE SPACE. The Office of the Quartermaster General has set the following standards for an approximate upper limit. They may be reduced if local conditions warrant.

(1) *Stations under 3,000-man troop strength.*

(*a*) Frozen-food storage space (10° F.)—one prefabricated frozen-food storage refrigerator, type KE-25-27, 275-square-foot.*

(*b*) Cooler storage space (30° F. and over)—0.4 square foot per man.

(2) *Stations of 3,000 to 5,000-man troop strength.*

(*a*) Frozen-food storage space (10° F.)—one prefabricated frozen-food storage refrigerator, type KE-25-28, 550-square-foot.*

(*b*) Cooler storage space (30° F. and over)—0.4 square foot per man.

* Applies only to stations served from market center so distant that frozen food must be picked up 5 days or more in advance of issue.

(3) *Stations over 5,000-man troop strength.* (*a*) Frozen-food storage space (10° F.)—0.1 square foot per man.

(*b*) Cooler storage space (30° F. and over)—0.3 square foot per man.

b. HOSPITALS. The above policy does not apply to general hospitals or station hospitals not served by post quartermaster facilities. The post engineer will correct essential refrigerated-storage deficiencies where necessary to meet the requirements of the individual hospital.

c. STORAGE-ROOM TEMPERATURE. Frozen-food storage rooms will be used only for storing food received frozen; they will not be used to freeze food. Temperatures in these spaces will not exceed an average of 10° F. Cooler storage rooms will not operate below 30° F.

d. BRINE-SPRAY UNITS IN COLD-STORAGE ROOMS. Only sodium chloride brine solution will be permitted in brine-spray units serving cold storage rooms for perishable food. Inhibitors for corrosion and rust control are harmful to food products and their use in brine-spray units delivering air to food-storage spaces will not be permitted. Rust and corrosion of metal surfaces in these units will be controlled where necessary by applying a suitable protective paint.

e. MEAT HOOK, OVERHEAD MEAT TRACKS, AND TRACK SCALES. Trolley type meat hooks which become a fixed part of the cold-storage warehouse will be provided by the post engineer. One trolley type meat hook per foot of overhead meat track in cold-storage-rooms is adequate. Plain, removable, hook-over type meat hooks are quartermaster equipment and will be provided by the post quartermaster (supply officer). Cantilever track scales for cold-storage plants are generally used only in accepting meat from the vendor. One scale on the receiving track will suffice inasmuch as the tagged weights are generally used for receiving and issue of shipments obtained through quartermaster market centers. Local purchase of meat hooks, meat track, and track scales will be made only when they are not available from unused post facilities. Meat tracks will not be used in frozen-food storage spaces; all frozen food will be piled on floor dunnage.

f. SHELVES. Shelves will not be used to conserve floor area in frozen-food and cooler storage spaces.

g. DIRECTIVES ON PERISHABLE FOOD. The following publications of the Office of the Quartermaster General and the Adjutant General pertaining to warehousing of perishable subsistence will be used as a guide: TM 10—610 and SB 10—153 and 10—187.

4.65. Gas Masks and Canisters

a. REQUISITIONS. Requisitions from class I, II, III, and IV stations for special-purpose masks and canisters for repairs and utilities purposes will be submitted to the service command engineer. Requisitions for the following masks and canisters approved by the service command engineer will be forwarded direct to the appropriate Chemical Warfare Service depot for supply. (See *b* below.) However, exceptional issues of canisters and masks will be requisitioned from the appropriate depot through the Office, Chief of Chemical Warfare Service.

Gas masks

Mask, gas, service, M2A2, acid-vapor M1—111A1
Mask, gas, diaphragm, M3A1, all-purpose M1—1VA1
Mask, gas, service M2A2, ammonia M1—111A1
Mask, gas, service, M2A2, HCN, M2—IVA1
Mask, gas, service, M2A2, oil-vapor M1—111A1

Canisters

Canister, acid-vapor, M1
Canister, all-purpose, M1
Canister, ammonia, M1
Canister, HCN, M2
Canister, oil-vapor, M1

b. DEPOTS. Service command engineers will forward approved requisitions directly to the appropriate Chemical Warfare Service depot as follows:

Item	*Supply Depot*
Gas masks for use in First through Sixth Service Commands or corresponding divisions.	The Commanding Officer Eastern Chemical Warfare Depot Edgewood, Maryland
Gas masks for use in the Seventh, Eighth, and Ninth Service Commands and corresponding divisions.	Chemical Warfare Supply Officer Utah ASF Depot Ogden, Utah.
Canisters for use in *all* service commands and divisions.	The Commanding Officer Indianapolis Chemical Warfare Depot 2060 Northwestern Avenue Indianapolis, Indiana.

c. LOCAL PURCHASE. On approval by the service command engineer, special-purpose industrial masks not listed above and respirators required for repairs and utilities purposes may be purchased directly with locally available repairs and utilities funds. Such special-purpose items will be procured directly in accordance with the general schedule of supplies entitled Special Wearing Apparel (grade 37, supp. No. 5), Procurement Division, Treasury Department. Items not listed therein may be procured directly from any source and should not be requisitioned from Chemical Warfare Service.

d. OPERATING INSTRUCTIONS. Instructions in TM 3-205, instructions on canisters, and information from the local Chemical Warfare Service officer will be observed in the use of gas masks and canisters.

4.66. Use of Refrigerants

a. FREON-12. Freon-12 may be used in new installations or for continued operation of existing systems permitted by WPB order M-28, as amended and interpreted.

b. CONVERSION TO METHYL CHLORIDE. Subject to the exceptions in *a* above, the following Freon-12 refrigeration systems will be converted to methyl chloride when they cease to function properly because of lack of refrigerant charge:

(1) All systems employing air-cooled condensers.

(2) All single-compressor systems where equipment is located in a space providing 1,000 cubic feet or more per 10 pounds of refrigerant charge. This group includes but is not limited to warehouse type installations, mess refrigeration systems, morgue refrigeration systems, photographic storage and processing systems, and water or brine cooling systems for process requirements.

c. CONVERSION TO METHYL CHLORIDE OR DISCONTINUANCE. The following types of Freon-12 refrigeration systems will be converted to methyl chloride when they cease to function properly because of lack of refrigerant charge or will be discontinued if they cannot be converted:

(1) Carbonated and malt-beverage cooling or storage systems.

(2) Drinking-water coolers.

(3) Refrigerated bain-marie (salad coolers).

(4) Soda fountains and fountainettes.

(5) Ice-making systems (bulk or flake type).

(6) Refrigerated ice-storage rooms or buildings.

(7) Air conditioning systems on list A, WPB order M-28, as amended.

d. CONVERSION PROCEDURE. All conversions from Freon-12 will conform to requirements of the American Standard Safety Code for Mechanical Refrigeration. These requirements vary with the kind and quantity of refrigerant, occupancy of the building, and other factors, and the code must be consulted to determine safety requirements for any particular system to avoid serious fire, explosions, and toxic hazards. Conversions of existing refrigeration systems will follow recommendations and instructions of the technical service having jurisdiction over operation and maintenance of the equipment; they should be made only after obtaining recommendations of the manufacturer of the complete system or each major part of built-up systems.

e. EXCEPTIONS. Exceptions to the above policy will be submitted for clearance with Production Division, Headquarters, ASF.

4.67. Supply of Refrigerants

Service command engineers will order monthly supplies of Freon-12 from Pennsylvania Engineering Company, Philadelphia, Pennsylvania, on notification of allotment by OCE. Posts will be supplied required amounts of Freon-12 for repairs and utilities purposes from the service command stock. Requests for Freon-12 for Army post exchanges will be submitted directly to the Chief of the Army Exchange Service, 25 West 43d Street, New York, by the post exchange officer without reference to the post or service command engineer. Other refrigerants, such as ammonia, sulfur dioxide, and methyl chloride, will be purchased locally in rented or loaned cylinders. Empty refrigerant cylinders, whether private or government owned, will be returned collect freight 1 day after they are emptied. Government-owned Freon cylinders, except those which are used for service, are to be shipped by freight collect to Kinetic Chemicals, Inc., Carney's Point, N. J., when empty. Local purchase of refrigerant cylinders is not authorized.

4.68. Accountability for Government-owned Freon Gas Cylinders

Filled Government-owned Freon cylinders received at a service command engineer warehouse from the manufacturer will be accounted for and picked up on the warehouse stock record. Cylinders will be shipped to individual posts on a War Department shipping document which will serve as a credit voucher to the warehouse stock account. Cylinders received by the post engineer will be picked up on the stock record cards in accordance with TM

5-601 (when published). The service command War Department shipping document will be the debit voucher to this account. Empty cylinders will be shipped collect freight to Kinetic Chemicals, Inc., on a War Department shipping document, a copy of which will act as a credit voucher to the post engineer's stock account. Two copies of this document will be forwarded, one attached to the requisition to service command for additional refrigerant, the other to the District Engineer, U. S. Engineer Office, Military Supply Division, 1400 Penn. Mutual Building, Philadelphia, Pennsylvania, Attention of Property Officer. No attempt will be made to account for cylinders by serial number.

4.69. Supply of Mechanical Refrigerators

a. REQUISITIONS. Mechanical refrigerators required for repairs and utilities work and listed in Equipment Manual for Area and Post Engineers will be furnished to posts, camps, and stations on requisition. As the need arises, requisitions for initial requirements will be forwarded through appropriate service command channels in accordance with existing regulations. Initial requirements or complete replacements for AAF control depots will be furnished without reimbursement,

b. INFORMATION REQUIRED. Requisitions for refrigerators purchased centrally will include the following:

(1) For refrigerators to supplement existing capacity in mess halls for warehouses—

(*a*) Number of persons being served.

(*b*) Type and plan number of building containing the facility.

(*c*) Cubic contents of existing refrigerated space.

(*d*) Additional refrigerated space required.

(2) For frozen-food refrigerators (10° F.) in hospital, consolidated mess, or warehouse:

(*a*) Name and location of market center which serves post.

(*b*) Distance from market center to post.

(*c*) Present schedule of deliveries from market centers.

(*d*) Items of subsistence delivered frozen.

(*e*) Time between delivery from market and issue.

(*f*) Frozen-food storage space (10° F.) now available.

(*g*) Approval of service command or air force quartermaster or supply officer.

4.70. Drinking-water Coolers

a. RESTRICTIONS. The ANMB List of Prohibited Items for Construction Work prohibits the use of iron and steel in the manufacture of drinking-water coolers for land use. War Department policy prohibits purchase and installation of drinking-water coolers except for limited use in hospitals.

b. EXCEPTIONS. Requests for exceptions to the provisions of the ANMB List, including those for hospitals, will include:

(1) Specific information on intended use.

(2) Number and capacity of coolers desired.

(3) Number of persons to be served.

(4) Maximum temperature of water available for drinking purposes.

(5) Availability of desired equipment from existing stocks.

(6) Other pertinent information which will affect a decision on essentiality.

c. HOSPITALS. Drinking-water coolers in hospitals will be installed in spaces where a minimum number of coolers will serve the maximum number of patients. Areas and offices visited by few patients are excluded. Requests for exceptions will be confined to the types and sizes permitted by WPB orders or to equipment available in existing stocks. No requests will be made for equipment which requires an appeal by a manufacturer to the WPB for permission to manufacture.

4.71. Manufacturing Plants

Responsibilities for operating refrigeration and ice plants at industrial sections of government-owned and operated Chemical Warfare Service and Ordnance Department armories, arsenals, and proving grounds are as indicated below; OS denotes operating service and RU denotes repairs and utilities. For a list of facilities to which this policy applies, see paragraph 1.9.

Operation	*Responsibility*
Industrial refrigeration*	OS
General post-use plants.....	RU
Sale of ice	OS
Nonindustrial refrigeration	RU
Compressed-air system	OS

* Refrigeration engineers in OCE and service command engineers in each service command are available to assist in problems of operation and maintenance.

Section VI. WATER AND SEWAGE

4.72. Water Services

Policy for water services is contained in AR 100-90.

4.73. Sale of Water Service

AR 100-90 governs the sale of surplus water, including sale to Government-owned civilian war-housing projects located outside military reservations.

4.74. Sale of Sewage Disposal Service

a. PERMISSION TO SELL. Army sale of sewage disposal services during the national emergency is approved where:

(1) Sewage treatment is essential to health at the post or in surrounding areas affecting health at the post.

(2) Surplus sewage treatment capacity exceeds any known future needs of the post and sale conserves critical labor and materials.

(3) The best interests of the United States are served.

b. CONTRACTS OR PERMITS. Sale of sewage disposal service may be either by *contract* or *permit*. The service command engineer has authority to furnish such services by contract if granting rights to enter Government real property or easements over real property are not necessary. If granting right to enter, construct, and maintain a connecting sewer or appurtenances on Government property is required, the Secretary of War can grant a permit in which terms of sale of sewage disposal may be incorporated. (See AR 100-62.) All contracts or permits will contain necessary provisions safeguarding the Government's interests, including a terminating clause with ample notice of termination.

4.75. Manufacturing Plants

Responsibilities for water supply and sewage functions for industrial sections of Government-owned and operated Chemical Warfare Service and Ordnance Department armories, arsenals, and proving grounds are indicated below; OS denotes operating service and RU denotes repairs and utilities. For a list of facilities to which this policy applies, see paragraph 1.9.

a. WATER SUPPLY.

Operation	*Responsibility*
Purchase of water:	
Industrial	OS
Building and grounds (by reimbursement)	RU
Operation of water treatment plant	OS
Operation of water-pumping plant	OS
Maintenance of distrbution system:	
Outside buildings	RU
Inside buildings:	
Industrial use	OS
Sprinkler use	OS
Health, sanitation, cleaning, washing, drinking, and sewerage use (by reimbursement)	RU
Contract	
Provisions and execution	OS
Review and approval	OS & RU

b. SEWERAGE.

Operation	*Responsibility*
Purchase of service	RU
Operation of sewage-treatment plant	RU
Operation of sewage-pumping plant	RU
Maintenance of collection system:	
Outside buildings	RU
Inside buildings:	
Industrial waste if separate treatment plant required	OS
Sanitation waste and industrial if no separate plant required	RU

c. STORM-WATER DRAINAGE.

Operation	*Responsibility*
Operation of drainage pumps	RU
Maintenance of entire system	RU

d. HIGH-PRESSURE WATER SYSTEM OPERATION ..... OS

Note. Sanitary engineers are available in OCE and in the service command engineer's office for technical assistance on problems concerning the above.

4.76. Water Conservation

a. MEASURES. Positive action will be taken to eliminated water waste and to reduce per capita consumption.

b. URINAL FLUSH VALVES. Self-closing flush valves will be installed on urinal troughs equipped with perforated flush pipes. Steps will be taken to eliminate excessive consumption by other type urinals.

4.77. Water Metering

A master meter will be installed for each source of water supply. Supply from several sources, such as several deep wells or separate points of purchase, will be metered at each source.

4.78 Water-level Gauges for Wells

Drawdown or water-level testing gauges will be installed in all active deep wells to provide daily operating data essential for further development of underground water supplies and for pumping schedules.

4.79. Water Mains

Water mains will not be installed to provide fire protection in ammunition storage areas unless the Chief of Ordnance rules that special conditions make their installation necessary.

4.80 Swimming Pools

a. OPERATION. All swimming pools, reservoirs, or tanks used for swimming, whether constructed with appropriated or nonappropriated funds, will be operated in accordance with TB MED 163. Approval will be secured from the commanding general of the service command in accordance with AR 100-90 and will depend on availability of water supply, conformance to sound sanitation, and reasonable operating costs. Repairs and utilities funds can be used to purchase operating supplies such as water chemical and chlorine when the United States has title to the pool, tank, or reservoir and operation has been approved by the commanding general of the service command. Subject to provisions of the lease, leased pools are considered to be under War Department control, vesting the Government with a real property interest justifying use of repairs and utilities funds for operation.

b. CONSTRUCTION. No new swimming pools, reservoirs, or tanks of any type to be used for swimming will be constructed with appropriated funds without the approval of the Chief of Staff. Swimming pools, reservoirs, or tanks to be constructed with nonappropriated funds will be approved in accordance with paragraph 1.16. The following additional factors will also be considered:

(1) Duration of activation of the post, camp, o station.

(2) Construction design, which must conform t sound sanitary practices.

(3) Minimum use of critical materials.

(4) Reasonable construction cost.

(5) Conformance to War Department construc tion policy and provisions of paragraph 2.2*b*.

c. REPAIRS. Appropriated funds for repairs an utilities work on Government-owned pools, reser voirs, or tanks for swimming will be spent in accord ance with AR 100-80 and WD Circular 388, 194 Nonappropriated funds for maintenance and repai on pools, reservoirs, or tanks for swimming will b spent in accordance with paragraph 1.16.

4.81. Chlorination of Water

a. CHLORINE RESIDUAL. A chlorine residual of a least 0.4 ppm after a 30-minute-contact period in th system or in a closed sample bottle will be maintaine at all times in those parts of the potable-water distri bution system under constant circulation. This doe *not* apply to water directly supplied to posts, depot leased buildings, and similar facilities by a satisfac tory, chlorinated, public water supply distributio system. It *does* apply to:

(1) Army-owned and operated well and surfac supplies.

(2) Nonchlorinated water from municipal or pri vately-owned sources.

(3) Chlorinated water from municipal or pri vately-owned systems where sanitary, physical, c operating defects or other special hazards are know to exist or where bacteriological examinations sho that satisfactory quality cannot be obtained witho rechlorination by the post.

b. EXCEPTIONS. The foregoing is not mandator if—

(1) Following chlorination, the water is store for long periods in properly protected distributio reservoirs.

(2) Iron, manganese, or other chlorine-consumin compounds make it impractical to maintain a chlorin residual of 0.4 ppm. In such cases additional treat ment may be required to produce water of acceptabl bacteriological quality.

c. USE OF AMMONIA. If use of chlorine alone re sults in objectionable tastes and odors due to foreig matter or to the chlorine itself, ammonia may be use with the chlorine. This use will be restricted to lo cations where the tastes and odors are highly ob jectionable.

4.82. Chlorination of Sewage

Except in emergencies or where required for satisfactory sanitation within a military reservation, specific approval by service command will be required for chlorination of sewage plant effluents. Approval will be recommended only where chlorination is clearly needed to protect public health or, in limited instances, where required to control nuisance conditions.

4.83. Chlorinating Agents

a. SUPPLY OF CALCIUM HYPOCHLORITE. Stocks of grade A calcium hypochlorite will be maintained in engineer depots and engineer sections of ASF depots. Requisitions for calcium hypochlorite for repairs and utilities purposes will be sent for approval to the service command which will forward them to the proper distribution depot.

b. CONSERVATION OF CALCIUM HYPOCHLORITE. *High-test calcium hypochlorite* will not be used in continental United States, except for water purification, including Lyster bags. Sodium hypochlorite solution, grade D, (Fed. Spec. OB-441a) will be substituted for grade A calcium hypochlorite to chlorinate post water supplies, except where climate or lack of local sources of supply make substitution impractical.

c. SUPPLY OF CHLORINE CYLINDERS. Stocks of 150-pound-capacity chlorine cylinders will be maintained by service commands for limited issue. Chlorine cylinders will be requisitioned from the service command engineer on the basis of chlorine consumption, shipping time, and time needed for refill. *Except in emergencies,* requisitions for chlorine cylinders for facilities exempted from service command repairs and utilities supply responsibility will be forwarded by the service command to OCE for approval.

d. PROCUREMENT OF CHLORINE. Individual service commands are responsible for contracts for procuring chlorine in Government-owned cylinders for water and sewage treatment at Army posts.

4.84. Gas Masks

For policy on procuring gas masks, see paragraph 4.65.

4.85. Submission of Water Samples for Chemical Analyses

When field analyses are impractical, complete chemical analyses of post water supply may be obtained by submitting samples to the Geological Survey. The Water Resources Branch, U. S. Geological Survey, Washington, D. C., will supply sample bottles, shipping containers, and instructions on request. Whenever possible, field tests for pH and dissolved oxygen and carbon dioxide should be made when samples are taken, and the data obtained sent with the samples to the Geological Survey.

4.86. Scale and Corrosion in Potable-water Supply Systems

Threshold conditioning will be used to control scale and/or corrosion in potable-water supplies, particularly in hot-water systems, in accordance with established procedures. Technical problems which arise will be referred to the service command engineer who has competent personnel available to recommend methods of treatment and chemicals to be used. Contracts for potable-water treatment by private industrial or commercial firms are not authorized.

4.87. Safeguarding Port Water Supplies

The following precautions for reducing health hazards through pollution of drinking-water sources will apply to all War Department installations at pier, warehouse, and dock facilities, and to vessels moored to waterfront facilities under War Department jurisdiction.

a. AT PIERS. No cross connections, siamese or others, will exist between shore drinking-water supply and nonpotable-water supply systems for fire fighting or other purposes.

b. VESSELS WITH POWER. No cross connections will exist between shore drinking-water supply and nonpotable- or unsafe-water supply systems on vessels moored to water-front facilities when such vessels have power to operate fire or other pumps.

c. VESSELS WITHOUT POWER. Whenever a vessel moored to a water-front facility is without power to operate its fire pumps, a water supply for fire protection will be made immediately available by taking the following measures:

(1) Water from the shore drinking-water system may be brought aboard for fire protection by separate hose lines or other means, provided there is no connection between the shore drinking-water system and any other water source.

(2) If the vessel has no power to operate its pumps, a connection from the shore drinking-water system to the vessel's fire and sanitary-flushing systems may be made with a fixed pipe or hose line, provided that satisfactory backflow prevention devices are installed between the vessel and shore sys-

tems at individual outlets and that such installations meet the minimum requirements of local health codes or regulations or of agreements made with local health authorities for this specific wartime use.

(3) If the connections described in (2) above, are not feasible, hose lines may be led aboard and necessary adapters and fittings furnished for making a physical connection between the shore drinking-water system and the vessel's fire system. However, no actual connection will be made for fire fighting until an alarm is sounded. A man on watch will be assigned to complete all connections and open necessary valves when the alarm sounds. He will break the connections as soon as the alarm ends. He will be responsible for notifying the local health officer and local water superintendent when such connection is made.

(4) If water for sanitary fixtures cannot be provided as in (2) above, portable gasoline-engine or motor-driven pumping units may be used for this purpose if no cross connection is made with the vessel's potable-water supply.

(5) The connections described in (1) or (2) above, either with or without approved backflow prevention devices, will not be made while any other connection to an outside non-potable- or unsafe-water supply exists or after the vessel's pumps are in operation.

(6) These requirements will not be construed to conflict with Coast Guard Regulations concerning Security of Vessels in Port.

Section VII. UTILITIES CONTRACTS

4.88. Responsibility

Commanding generals of service commands, air forces, or AAF commands are responsible for furnishing utilities services to posts, camps, and stations in the United States, except as prescribed in AR 100-80. Post engineers, as staff officers, are responsible for utilities services to posts.

4.89. Functions of Service Command Engineers

a. To readjust utility contracts in the Government's favor at service command installations, the service command engineer will:

(1) Advise area and district engineers in negotiating rates for new contracts.

(2) Review and, if necessary, readjust rates of service command contracts for repairs and utilities purposes at posts, camps, manufacturing plants, and other military installations.

(3) Periodically survey load characteristics affecting rates at posts, camps, manufacturing plants, and other military installations under service command jurisdiction to determine need for further rate adjustment.

(4) Furnish the service command legal staff with engineering data necessary to prepare, execute, or revise utility contracts.

(5) Maintain liaison with State and municipal bodies regulating utilities.

b. AT OTHER INSTALLATIONS. Installations not under the service command for repairs and utilities purposes can request the assistance of the service command engineer for the services in *a* above.

4.90. War Department Power Procurement Officer

a. OCE RESPONSIBILITY. A War Department Power Procurement Officer located within OCE is designated in paragraph 394.2, WD Procurement Regulations. For contracts of 1,000 kilowatts or over where the War Department has interest in cost, the War Department Power Procurement officer is responsible for:

(1) Reviewing contracts and initiating modifications or changes necessary to comply with the President's directives.

(2) Reviewing proposed contracts and supplements to existing contracts which extend time, alter contract price, or make substantial change in terms, to assure compliance with the President's directives.

b. REPRESENTATIVES OF POWER PROCUREMENT OFFICER. Repairs and utilities divisions of offices of service command engineers will represent the War Department Power Procurement Officer, and under his direction will carry out necessary field activities concerning contracts and supplements thereto for electrical service of 1,000 kilowatts or over to all establishments within the geographical boundaries of the service commands, if the War Department has an interest in the cost of such service. Commanding officers at such establishments will assist

these representatives by furnishing all information required.

4.91. Form of Contracts

Utility contracts will adhere as closely as possible to WD Contract Form 15, War Department Negotiated Electric Service Contract (Connection Charge) and WD Contract Form 27, Negotiated Utility Service Contract (No Connection Charge—Electric, Gas, Water, Sewage Service) with modifications suggested herein. These forms are set forth in WD Procurement Regulation 13.

4.92. Term of Contract

Utility contracts should continue until further notice, although whenever possible the Government will ask the right to cancel within 30 days. However, if a longer cancelation period is needed to obtain a more favorable rate, contracts may be drawn with a maximum cancelation period of 90 days or with minimum charges continuing until the end of the contract year.

4.93. Applicable Rates

Army installations having load characteristics comparable to industrial and municipal loads will, whenever possible, be served at the lowest industrial, municipal wholesale, or comparable Government service rate. When a rate is made part of a contract, all provisions of the rate which may affect the cost of service to the Government will be included.

4.94. Connection Charges

a. PAYMENT. Connection charges will be paid by the Government only for temporary Army installations, and when the connections built will not usefully serve other loads after Army use is discontinued.

b. REFUND OF CONNECTION CHARGES. Net cost to the Government of connecting facilities less estimated salvage value will, whenever possible, be refunded from monthly payments for service within 5 years. The percentage of monthly bills so refunded should be as high as load conditions warrant and never less than 10 per cent.

4.95. Prompt-payment Discounts

Prompt-payment discount periods or penalty provisions for delayed payments will allow the Government time to pay bills without penalty or loss of discount. Whenever possible such periods will not be less than 30 days.

4.96. Combined Loads and Meter Readings

Whenever practicable, loads will be combined in order to obtain the lowest cost of utility service, due consideration being given to the critical materials required. Cost of combining loads at temporary Army installations will not exceed estimated savings for a 3-year period. When combined meter readings can be billed as one quantity at the same rate as for combined loads, the methods requiring least use of critical materials will be employed.

4.97. Meter Testing and Refunds

Contract provisions concerning meter testing and refunds for inaccurate meters will conform as closely as practicable to regulations of the State or local body having jurisdiction.

4.98. Primary Electric Service or Metering Discounts

When electric service at Army installations is furnished and billed at secondary voltage but metered at primary voltage, the contract will provide an equitable discount to reimburse the Government for transformer losses. When electric service is furnished and metered at primary voltage but billed at a secondary rate, the contract will provide an equitable discount for both transformer losses and Government ownership of transformers.

4.99. Procedure

Post engineers, acting for post commanders, will notify commanding generals of service commands of rates, rules, and contract provisions which cannot be adjusted by mutual agreement between contracting officers and contractors. Service command engineers, acting for commanding generals of service commands, will help post engineers get necessary rate adjustments. If adjustments cannot be obtained by mutual agreement between service command engineers and contractors, service command engineers will appeal to the appropriate State or local regulatory bodies having jurisdiction over the rates and rules of the contractors. When service command engineers feel that agreements satisfactory to the Government have not been obtained, they will make factual reports for commanding generals of service commands to the Chief of Engineers or the War Department Power Procurement Officer, whoever has approval authority.

4.100. Sale of Surplus Utilities Services

For policy on the sale of surplus utilities services, see AR 100-90.

CHAPTER 5

FIRE PROTECTION AND PREVENTION

CHAPTER 5

FIRE PROTECTION AND PREVENTION

Section I. INTRODUCTION

5.1. War Department Fire-protection Program

The War Department fire-protection program consists of four phases:

a. DESIGN. Features and devices which decrease fire hazards will be designed as a structural part of buildings or projects.

b. CONSTRUCTION. The designed fire-protection features will be built into the structures.

c. FIRE PREVENTION. Defects in existing structures will be found and corrected. Adequate safeguards will be employed in storing and handling materials and equipment. Sound housekeeping practices will be established and maintained.

d. FIRE FIGHTING. Facilities and methods will be provided and used to control and extinguish fires with minimum damage to life, property, and the military program.

5.2. Adjustments in Program

The degree of fire protection at War Department installations may be adjusted by criteria developed by the War Department or by the subordinate agency having responsibility. Adjustments ordered in overall protection will be made promptly. The War Department will accept additional risks resulting from such adjustments involving reductions brought about by War Department directives.

5.3. Airplane Crash Fire Fighting and Crash Rescue

As used in this manual, *fire protection and fire prevention* does not include airplane crash fire fighting and crash rescue.

Section II. RESPONSIBILITIES AND FUNCTIONS

5.4. Chief of Engineers

a. STAFF SUPERVISION FOR ASF. The Chief of Engineers will carry out the following responsibilities of the Commanding General, ASF:

(1) Staff supervision for fire prevention and protection at new construction projects performed under OCE supervision and at all class I, II, IV, and special installations, except those named in paragraphs 5.6 and 5.7.

(2) Preparing uniform technical policies, procedures, and standards for Army-wide application, and inspecting all class III installations for compliance with War Department policies.

(3) Establishing War Department construction policy on fire prevention and protection, procurement of fire-fighting and fire-prevention equipment, and necessary incidental coordination measures.

b. SUPERVISION OF INSTALLATIONS UNDER SERVICE COMMAND. At military posts where commanding generals of service commands are responsible for fire prevention and protection, the Chief of Engineers will supervise the following:

(1) Determining degree of fire-protection features incorporated in site planning, structural design, and installed equipment, including installed fire-protection systems.

(2) Determining criteria for organizing fire-protection forces and distributing fire-fighting equipment.

(3) Developing standards for all installed and movable fire-protection equipment.

(4) Budgeting equipment and operating funds.

(5) Establishing fire-prevention regulations.

(6) Supervising organization, personnel, equipment, training, operations, inspections, and maintenance needed to control and extinguish fires.

(7) Enforcing fire-prevention regulations and promoting fire-prevention educational programs.

(8) Keeping fire-loss experience statistics.

5.5. Commanding General, AAF

The Commanding General, AAF is responsible for execution of fire-prevention and protection at all class III installations, subject to provisions of paragraph 5.4*a*(2).

5.6. Chiefs of Ordnance and Chemical Warfare Service

The Chief of Ordnance is charged with staff supervision and command responsibility for fire prevention and protection at class IV installations under his direct command which manufacture, process, or store explosives, propellants, or explosive ingredients. The Chief of Chemical War Service performs the same functions for class IV installations under his direct command which manufacture, process, or store explosive, incendiary, poisonous, vesicant, or irritant products. Chiefs of these services are also responsible for making production security inspections at installations assigned them on the Installation Security Inspection Responsibility List and at privately-operated facilities assigned on the Master Inspection Responsibility List. By specific agreement with the Chief of Engineers, they may be delegated responsibility for carrying out fire-prevention and fire-protection measures at class IV industrial, manufacturing, or agent-operated installations not included above; however, delegation of responsibility for execution will *not* alter responsibility for staff supervision and technical inspections assigned the Chief of Engineers and commanding generals of service commands. (See pars. 5.4 and 5.9.)

5.7. Chief of Transportation

The Chief of Transportation is charged with staff supervision and command responsibility for fire prevention and protection at ports of embarkation under his direct command, including staging areas and other sub-installations of ports of embarkation. He is also responsible for making production security inspections at installations assigned him on the Installation Security Inspection Responsibility List.

5.8. Provost Marshal General

The Provost Marshal General is responsible for staff supervision of fire prevention, fire protection, and inspection at privately-operated facilities assigned to ASF on the Master Inspection Responsibility List. He will keep informed of fire-prevention and protection measures at installations assigned to ASF on the Installation Security Inspection Responsibility List to make certain that fire-prevention and fire-protection responsibilities of Chiefs of Engineers, Transportation, Ordnance, and Chemical Warfare Service are coordinated with the appropriate Internal Security Program without duplication of activity.

5.9. Commanding Generals of Service Commands

Commanding generals of service commands are responsible for adequate fire-prevention and protection measures at class I, II, and IV installations, except as indicated in paragraphs 5.6 and 5.7; and for making technical inspections of class III installations charged to the Chief of Engineers. (See par. 5.4*a*(2).) This responsibility generally is carried out by service command engineers and post engineers. At installations where the Installation Security Inspection Responsibility List makes commanding generals of service commands responsible for production security inspections, the fire-prevention and protection portions of the inspections may be delegated to representatives of the service-command engineer or the service command director of security and intelligence. If their respective activities can be coordinated without duplication, representatives of both may inspect. Commanding generals of service commands are responsible for conducting production security inspections of privately-operated facilities assigned them on the Master Inspection Responsibility List.

5.10. Commanding Generals of Air Forces and AAF Commands

Commanding generals of air forces and AAF commands are responsible for carrying out fire-prevention and protection measures at class III installations under their jurisdiction.

5.11. Service Command Engineers

In carrying out the responsibilities of commanding generals of service commands at class I, II, and IV installations, service command engineers will:

a. Coordinate and carry out the fire-protection and fire-prevention program at all posts in maintenance area.

b. Achieve proper distribution of fire-fighting equipment and facilities.

c. Supervise training of fire department personnel.

d. Inspect equipment in service and take necessary steps to improve its condition.

e. Review the training and operating effectiveness of fire department personnel.

When making technical inspections of class III

installations, the service command engineer will assist in performance of the functions listed above on request.

5.12. Post Commanders

Post commanders and officers in charge of new construction projects under jurisdiction of the Chief of Engineers are primarily responsible for fire prevention and protection at their installations or projects. Where new construction projects are undertaken at activated installations, fire-prevention and protection responsibilities of the officer in charge of construction will be coordinated with those of the installation commander.

5.13. Post Engineers

Where the commanding general of the service command, air force, or AAF command is responsible for performance of fire prevention and protection, the post engineer, designated fire marshal by the post commander, will be responsible for administration and organization of the following fire-protection and fire-prevention activities:

a. Setting up and enforcing regulations and orders to reduce or eliminate all fire hazards in the area under his jurisdiction.

b. Organizing, instructing, and training designated fire-fighting personnel in all phases of maintenance and operation of fire apparatus, appliances, and systems.

c. Adequately distributing, installing, and maintaining all fire-protection equipment and systems.

d. Making regular periodic inspections of all buildings and tests of fire-protection systems, apparatus, and equipment, including recharging fire extinguishers.

e. Issuing necessary orders to fire department personnel to regulate duties affecting routine operations, fire-prevention inspections, and fire-fighting duties.

f. Investigating fires immediately to determine the cause, preserve all pertinent evidence, and prepare required reports and records.

g. Preparing reports, requisitions, and recommendations for necessary improvement or reduction in fire protection and fire prevention.

5.14. Organization of Post Fire Department

A fire-protection and fire-prevention system will be organized and maintained at each post. Where mobile fire protection is readily available from surrounding municipalities or other outside sources or where use of motor-driven fire apparatus is otherwise inadvisable, the system will consist of one or more organized fire brigades composed of enlisted men and/or civilians on duty at the post. Post fire department personnel will be divided into two equal groups, each being assigned to alternate 12-hour, 24-hour, or equivalent-hour tours of duty unless otherwise authorized by the commanding general of the service command, air force, or AAF command. Members of post fire departments will be subject to emergency duty at all times.

5.15. Advisory Bureau on Fire Protection

The National Board of Fire Underwriters maintains an Advisory Bureau on Fire Protection in the Fire Prevention Section, Repairs and Utilities Branch, OCE, to give engineering and advisory service. This bureau provides the War Department with experienced fire-prevention and fire-protection engineers throughout the United States. Services of these engineers may be requested through channels from the Fire Prevention Section, Repairs and Utilities Branch, OCE. Requests should be limited to major fire-protection problems.

Section III. PERSONNEL

5.16. Fire-prevention Engineers

Fire-prevention engineers with a thorough knowledge and background of experience in planning, developing, and maintaining suitable fire-prevention and fire-protection facilities are employed by OCE and by offices of service command engineers. Fire prevention engineers in OCE will be responsible to the Chief, Fire Prevention Section, Repairs and Utilities Branch, OCE, and those in offices of service command engineers will be responsible to the Chief, Fire Prevention Branch, Repairs and Utilities Division of the service command, for coordinating all fire-protection and prevention activities under the jurisdiction of those offices. They will also make technical inspections of AAF installations to ascertain that prescribed standards, procedures, and policies are being followed.

5.17. Fire Department Instructor-inspectors

Fire department instructor-inspectors, fully trained and experienced in fire-fighting operations, and inspecting, organizing, training, and determining of fire-protection requirements, are employed by OCE and by offices of service command engineers. OCE fire department instructor-inspectors will make regular inspection visits to each service command engineer office and to a suitable number of representative posts in each service command, in company with fire department instructor-inspectors under the service command engineer, to determine the adequacy of the fire-protection inspection and training program maintained by the service command engineer. They will also help the service command fire department instructor-inspectors organize inspection, post fire-department organization, and training activities. On request through the service command engineer, posts and service commands can get the assistance of fire department instructor-inspectors for special purposes. They will, upon request, help train fire personnel at class III installations and will make technical inspections of such installations to ascertain that prescribed standards, procedures, and policies are followed. Requests for temporary loans of service command instructor-inspectors between service commands for special purposes such as training schools, conferences, emergency operations, etc., will be coordinated through the Fire Prevention Branch, OCE. Commanding generals of service commands will cooperated in the inter-service command assignment of instructor-inspectors for special purposes.

5.18. Fire-truck and Equipment Inspectors

Fire-truck and equipment inspectors with thorough training and experience in mechanical operation and maintenance of motorized fire apparatus, pumping equipment, and fire-fighting appliances are employed by OCE and by offices of service command engineers. OCE fire-truck and equipment inspectors will make regular inspection visits to each service command engineer office and to a suitable number of representative posts in each service command, in company with fire-truck and equipment inspectors under the service command engineers, to determine the adequacy of the fire-truck and equipment maintenance program maintained by the service command engineer. They will also help organize maintenance activities of the service command fire-truck and equipment inspectors. Through the service command engineer, posts and service commands can request the assistance of fire-truck and equipment inspectors for special purposes. They will, upon request, help train fire personnel at class III installations and will make technical inspections at such installations to ascertain that prescribed standards, procedures, and policies are followed. Requests for temporary loan of service command fire-truck and equipment inspectors between service commands for special purposes such as training schools, conferences, emergency operations, etc., will be coordinated through the Fire Prevention Section, OCE. Commanding generals of service commands will cooperate in the interservice command loans of fire-truck and equipment inspectors for special purposes.

5.19. Post Fire Personnel

Normally, post fire-fighting personnel, including fire chiefs and assistant fire chiefs, will be civilian employees. Enlisted personnel from station complements will not ordinarily be assigned to full-time fire-fighting duty, but may be designated as auxiliary fire-fighting personnel by the post commander and organized and trained to supplement civilian full-time fire fighters. They will be required to report for training and to respond to fire alarms, and at such times will be under the post fire chief's direct supervision.

a. STRENGTH. Authorized strength of post fire personnel will be kept to the minimum consistent with post needs. Allowances will be based on the number of fire trucks in regular service and on the normal duties of the post fire department, such as inspection, training, routine duties, fire-alarm operation, maintaining fire-protection equipment, and fire fighting. Personnel will not be authorized for special brush fire trucks or other auxiliary or reserve types of fire apparatus unless such apparatus is considered to offset the need for regular fire trucks. Additional personnel will be authorized only with approval of the commanding general of the service command, air force, or AAF command.

b. REPLACEMENT OF PERSONNEL ON TERMINAL LEAVE. Fire-department personnel on leave without pay or on terminal leave are classified in the nonauthorized types and such as are not charged against authorized personnel ceiling figures. Replacement personnel may be employed without waiting for expiration of replaced personnel's terminal leave.

c. CLASSIFICATION. Post fire-fighting personnel will be classfied in accordance with job specifications listed in the Manual of Standard Job Descriptions, CPR 20.9, published by the Office of the Secretary

of War, and assigned to one of the following jobs:

(1) Fire chief.
(2) Assistant fire chief.
(3) Crew chiefs.
(4) Fire-fighter drivers.
(5) Fire fighters.

Duties of each classification are discussed in paragraphs that follow.

5.20. Fire Chief

a. GENERAL. The post fire chief will be responsible for the technical efficiency of fire-fighting personnel in his organization and for the mechanical operating effciency of all fire apparatus and equipment entrusted to his care.

b. DUTIES. His duties are:

(1) Conduct fire drills and instruct personnel in proper use of all fire apparatus and equipment.

(2) Qualify himself to detect improper methods used by his personnel in performing their duties.

(3) Make or direct regularly scheduled inspections of all buildings, areas, and installations of fire-extinguishing equipment and systems; keep records of defects noted and action taken to correct them.

(4) Keep a log record book and any other records needed to show all fire-department activities, including tests, drills, fires, installation of additional equipment, recharging date of fire extinguishers, etc.

(5) Keep all fire extinguishers in serviceable condition, properly charged, and adequately distributed in accordance with TM 5-689 and TM 5-603 (when published).

(6) Insure that motor-driven or other apparatus assigned to fire department responds on schedule to all fire alarms; take charge of laying hose lines and operating all fire-fighting equipment; and bring maximum required fire protection into service in case of fire.

(7) Enforce systematic and workmanlike execution of all routine fire department activities; keep all equipment and apparatus entrusted to his care clean and serviceable; and insure that fire department personnel conduct themselves properly at all times when carrying out their duties.

(8) Assume full authority over all fire-fighting units while responding to and fighting a fire, unless it becomes apparent to his responsible superior that he is not competent to handle a situation.

5.21. Assistant Fire Chiefs

Assistant fire chiefs will help fire chiefs carry out their prescribed duties, and will perform any other duties assigned them by the fire chief. In the fire chief's absence, the senior assistant fire chief present will assume his duties.

5.22. Crew Chiefs

Crew chiefs will be responsible for supervising opration of a group of fire fighters and fire-fighter drivers assigned to a single piece of fire apparatus or to a group of fire trucks in service in a single fire station. Crew chiefs will be responsible for operation of groups under their supervision; they will be in charge of fire-fighting operations pending the arrival of a superior fire officer.

5.23. Fire-fighter Drivers

Fire-fighter drivers will be responsible for proper operation of motor fire apparatus in responding to, operating at, and returning from all fires. Drivers will also be responsible for proper care and upkeep of their apparatus at all times, and will engage in frequent practice drills to insure prompt and efficient functioning of both men and equipment at all times.

5.24. Fire Fighters

Fire fighters will be responsible to the fire chief or assistant fire chief and will perform routine and fire-fighting duties assigned them by their superiors.

Section IV. FUNDS

5.25. Equipment

a. CENTRALLY PROCURED. OCE will budget funds for procuring centrally procured items of fire equipment; repairs and utilities funds controlled by OCE will be used.

b. LOCALLY PROCURED. Locally procured equipment and operating supplies will be provided from repairs and utilities funds alloted for post maintenance.

c. INSTALLED. Installed fire-protection equipment and systems, including fire-alarm and sprinkler systems, will normally be provided as new construction and paid for from construction funds controlled by OCE. Repairs and utilities funds may be used for work of this nature in accordance with

current instructions governing use of construction and repairs and utilities funds. (See par. 1.13.)

5.26. Personnel

Fire-fighting personnel will be paid from repairs and utilities funds alloted for post maintenance.

5.27. Contracts and Services

Repairs and utilities funds allotted for post maintenance will be used to meet contract obligations involving provision of fire-protection services. Service commands may finance centrally placed contracts for services to a group of posts. Applicable charges will be made against the respective posts for cost-accounting purposes.

5.28. Exempted Installations

a. FUNDS. At installations exempted from service command or AAF command jurisdiction for fire protection, repairs and utilities funds allotted from the service command or AAF command will not be used for personnel, locally procured equipment, operating supplies, or maintenance.

b. EQUIPMENT. Installations exempted from service command or AAF command jurisdiction for fire protection will be furnished centrally procured fire equipment without reimbursement.

Section V. EQUIPMENT

5.29. Centrally Procured Equipment

All major items of fire equipment, including fire trucks, auxiliary pumping equipment, hose, fire extinguishers, miscellaneous fire appliances, connections, fittings, and tools will be procured centrally. They will be issued to posts, camps, and stations by requisition from stocks maintained in engineer warehouses in each service command. For equipment available for issue from centrally procured stocks, see ASF Catalog ENG 5.

5.30. Locally Procured Equipment

On presentation of complete justification, the Chief of Engineers may authorize local procurement of nonstandard items of fire equipment which are not carried in stock.

5.31. Maintenance and Operating Supplies

Expendable maintenance and operating supplies will be procured locally as needed. Stock level of such supplies on hand at the post will be kept to the minimum needed for operating requirements. From time to time, production supply, and demand conditions may require service command or Chief of Engineers bulk procurement and storage of some operating supplies. In those instances, each installation will be given suitable instructions for requisitioning supplies.

Standard fire-protection operating supplies which are kept in engineer warehouses are primarily for troop and oversea supply purposes; however, on submission of justification, they are available for emergency issue to posts, camps, and stations in limited quantities.

5.32. Repair Parts

Normally, repair parts for fire equipment at posts, camps, and stations will be procured locally. Replacement pumps and major mechanical repair parts for fire trucks and auxiliary pumping equipment will be procured centrally and obtained by requisition on OCE. Repair parts for vehicle chassis for commercial, special engineer, and other nonstandard ordnance vehicles will be obtained through ordnance service command shops; parts for standard ordnance vehicles, from ordnance stocks of spare parts.

5.33. Requisitions

Requisitions for fire equipment stocked centrally will be submitted on standard requisition form to service command engineers for approval, together with complete justification. Requisition for post engineer fire equipment will be processed in accordance with TM 38-220.

5.34. Fire Equipment for Troop Supply

Fire equipment for troop supply purposes will be requisitioned in accordance with TM 38-220.

5.35. Fire Trucks

a. CLASS 750 AND 500 PUMPER FIRE TRUCKS. Normally, class 750 and 500 pumper fire trucks will only be provided for installations with an installed water supply system which can maintain a fire flow equal to the pumper capacity. Class 750

and class 500 fire trucks may be provided where no installed water supply system exists, if there is available reliable water sourse such as a river, pond, reservoir, harbor, etc. Since the supply of class 750 fire trucks it limited, they will ordinarily be distributed only to major storage depots, posts, hospitals, and major airfields where long hose lines may be required.

b. CLASS 325 AND 300 BRUSH OR FORESTRY FIRE TRUCKS. Class 325 and class 300 brush or forestry fire trucks will ordinarily be assigned as auxiliary vehicles at installations which have large areas without installed water supply system and which are subject to severe grass, brush, or forest fires. They may also be issued for primary protection at small installations with no installed water supply system.

5.36. Auxiliary Pumping Equipment

When justified, auxiliary pumping equipment consisting of fire type pumper trailers and skid-mounted pumping units may be obtained to supplement self-propelled fire trucks.

5.37. Fire Extinguishers

a. WATER TYPE. Water type hand fire extinguishers will be installed for basic fire protection in all barracks, warehouses, hospitals, and other types of buildings.

b. FOAM TYPE. Foam type hand fire extinguishers will be installed to supplement water type extinguishers in especially hazardous locations where fires involving oils and greases are probable.

c. CARBON TETRACHLORIDE TYPE. Carbon tetrachloride type hand or wheeled fire extinguishers will be installed to supplement water type extinguishers in especially hazardous locations where there is the possibility of fire involving oils and greases, machinery, and live electrical equipment.

d. CARBON DIOXIDE TYPE. Carbon dioxide type hand or wheeled fire extinguishers will be installed to supplement water type extinguishers in especially hazardous locations where fires are likely to involve oils, greases, gasoline, sensitive machinery or equipment, and live electrical installations.

e. WHEELED TYPE. Wheeled type fire extinguishers will ordinarily be installed only where extraordiniary hazards exist and where motorized fire apparatus is remote or inaccessible.

5.38. Fire Hose

a. TWO AND A HALF-INCH HOSE. Normally, enough 2½-inch hose will be issued to supply a complete working load of hose for each fire truck in actual service, with specified spare load in reserve. On presentation of suitable justification, 2½-inch hose will also be authorized for use with hose carts and yard hydrants.

b. ONE AND A HALF-INCH HOSE. Normally, enough 1½-inch hose will be authorized to provide a complete working load for each brush or forestry type fire truck, with a reasonable spare load in reserve. In addition, 1½-inch hose will be authorized for small lines on regular fire pumper trucks at depots, hospitals, airfields, and similar installations, and for use with installed standpipes.

c. BOOSTER, CHEMICAL, AND HIGH-PRESSURE HOSE. Booster, chemical, and high-pressure hose will be provided as needed to maintain required amounts on fire trucks and wheeled type fire extinguishers.

d. SINGLE- AND DOUBLE-JACKET FIRE HOSE. Double-jacket fire hose is standard for War Department use. Use of single-jacket fire hose will be necessary from time to time, but it should be distributed and used only where light water pressures will be encountered. Single-jacket hose should not be used at important depot, port, and hospital installations, or at airfields where long hose lines and higher pressures are anticipated.

5.39. Personal Equipment

a. FIRE-FIGHTING CLOTHING. The following fire-fighting clothing will be provided for each full-time civilian or enlisted fire fighter and for each two regularly organized civilians or enlisted fire fighters:

(1) Boots, rubber, firemen's.
(2) Gloves, leather, heavy.
(3) Coat, duck, firemen's.
(4) Helmet, plastic, firemen's.
(5) Trousers, bunking, firemen's.

b. DRESS UNIFORM AND WORK CLOTHING. Dress uniforms and work clothing will not be provided for civilian fire-fighting personnel. Employed personnel will provide themselves with any dress uniforms and work clothing which the post commander requires.

c. BADGES AND INSIGNIA. Special badges and insignia will not be provided for civilian fire-fighting personnel. To carry out official duties, ordinary identification badges required for security purposes will be provided from applicable local funds.

d. SPECIAL CLOTHING. Special protective clothing such as hoods, special gloves, face shields, etc., will not be considered personal clothing. Such items

will be provided as component equipment in accordance with current Tables of Allowances.

5.40. Gas Masks and Canisters

Requisitions for gas masks and canisters for fire-protection purposes will be submitted by post engineers to Chemical Warfare Service and transmitted through the service command engineer for approval. If approved for issue by the service command engineer, they will be furnished by Chemical Warfare Service without reimbursement.

Section VI. FIRE STATIONS

5.41. Number and Size of Fire Stations

The total number of fire stations will be no more than required for adequate distribution of motorized fire apparatus in accordance with current policy. Ordinarily, not more than three pieces of motorized fire apparatus will be assigned to a fire station. Generally, fire stations will be large enough to provide space for one more piece of motorized equipment than is normally in service; however, no extra space will be provided if the station has three or more pieces of equipment in service.

5.42. Type of Fire Station

Fire-station design should follow as closely as possible the standard plans developed by the Chief of Engineers.

5.43. Hose-drying Facilities

Special hose-drying towers are not normally authorized. Hose-drying and storage racks should be provided as specified in standard drawings for fire stations prepared by OCE.

5.44. Latrine and Lavatory Facilities

Latrine and lavatory facilities will not normally be installed where sleeping quarters are not provided. The cost of supplying such facilities and the proximity of available facilities in nearby buildings will be the governing factors in most cases.

5.45. Cooking and Mess Facilities

Special facilities for cooking and messing will not be provided in theater of operations type fire stations unless serious interference with duties of fire-fighting personnel would result if they were required to use mess facilities available on the post.

Section VII. INSTALLED FIRE-PROTECTION SYSTEMS

5.46. Fire-reporting Telephone Systems

Fire-alarm facilities at posts, camps, and stations normally will consist of standard fire-reporting telephone systems installed and maintained by the signal officer. Maintenance of manual transmitters and recording devices for these installations is a repairs and utilities responsibility of the post engineer.

5.47. Automatic Fire-alarm Systems

a. INSTALLATION. Automatic fire-alarm systems are authorized for specific hospital buildings that do not have automatic sprinklers. Where coded automatic alarms are installed in the hospital area, such systems may be extended to cover post warehouse areas. Installation is the responsibility of the Corps of Engineers.

b. MAINTENANCE. The post engineer is responsible for inspecting and maintaining all automatic fire alarms. Original systems are installed under standard OCE specifications which require 1 year of maintenance by the installing contractor. Subsequent maintenance may be done by the post engineer or, at the discretion of the service command engineer, by contract with the installing company or other qualified automatic fire-alarm company. Because these systems vary and are highly specialized, maintenance by contract is preferable unless qualified personnel are available to the post engineer or the service command engineer.

5.48. Manual Watch-report and Fire-alarm Systems

a. INSTALLATION. Manual watch-report and fire-alarm systems may be installed in the interiors of

buildings at depots, ports, and similar storage projects, and for exterior protection at such projects where the required number of exterior fire-alarm stations does not exceed the specified maximum. Otherwise, fire-reporting telephone systems will be installed for exterior protection. Installation is a responsibility of the Corps of Engineers.

b. MAINTENANCE. The responsibility for maintenance of manual watch-report and fire-alarm systems is the same as for automatic fire-alarm systems. (See par. 5.47*b*.)

5.49. Fire-alarm Sirens

a. INSTALLATION. Fire-alarm sirens or similar audible alarm devices are authorized for posts, camps, and stations having an organized fire department or fire brigade and requiring general-alarm notification. Requests for fire-alarm-siren installation will be submitted through the same channels as other repairs and utilities projects. Sirens will be provided locally and may be installed by local personnel or by contract.

b. LOCATION OF CONTROLS. Fire-siren controls should be located at headquarters fire station if the fire-reporting telephone system has a private switchboard. If the post does not have a private fire department switchboard, fire-siren controls should be at guard headquarters or other location where there is constant 24-hour attendance. Controls should not be located at the post administrative switchboard nor should post switchboard operators be required to transmit fire calls or *fire-alarm signals* other than directly to the post fire department, unless constant 24-hour attendance is not available elsewhere.

5.50. Automatic Sprinkler Systems

a. INSTALLATION. Automatic sprinkler systems will be authorized in accordance with paragraph 5.52. Normally this will include the authorization of automatic sprinkler systems in specified hospital buildings, industrial facilities plants, bomber assembly plants, aircraft modification centers, pier and storage facilities at ports of embarkation, depots and installations handling critical supplies, critical operational and experimental structures, substandard combustible structures used for troop housing, dry cleaning plants of combustible construction, large mobilization type laundries of frame construction, and fourth- and fifth-echelon motor-repair shops of large undivided areas. Installation is a responsibility of the Corps of Engineers.

b. MAINTENANCE. Generally, qualified post engineer personnel will maintain automatic sprinkler systems. Qualified technicians from OCE and from service command engineer offices will assist in special problems.

5.51. Standpipes

Permanent standpipe systems will be installed in unsprinkled laundries, theaters and recreation halls as indicated on Standard Plans, OCE. Standpipe systems may be installed in other buildings, such as those over 55 feet high, those covering excessively large areas, or those having abnormal fire-protection characteristics, by special authority of OCE.

5.52. Approval of Projects

The Chief of Engineers, under the Commanding General, ASF, is charged with the installation of fire protection systems, including sprinkler systems, at War Department installations for which he is responsible for construction, except that minor alterations and additions to such systems will be accomplished in accordance with current policies governing repairs and utilities matters. In the execution of these responsibilities, fire-protection systems may be provided where the lack of such systems would result in conditions exceptionally hazardous to human life, or where stored matériel, property, or processes are of such high monetary value or importance to the war effort as to justify installation of such protection, as determined by the Commanding General, ASF, or by the Commanding General, AAF. The closely controlled policy covering installation of automatic sprinklers and fire-alarm systems requires that complete plans and job descriptions on projects authorized by commanding generals of service commands, air forces, or AAA commands be submitted promptly to the Chief of Engineers for technical review.

Section VIII. OPERATIONS

5.53. Training

a. BY CHIEF OF ENGINEERS. The Chief of Engineers will prepare manuals on fire-fighting technique and on inspection and maintenance of equipment for publication by the War Department.

Intercommand training conferences to develop and promote improved and uniform methods will be arranged as needed.

b. By Service Command Engineers. Each service command engineer will hold centralized training conferences and schools in all phases of fire prevention and protection to develop and promote improved uniform methods throughout the service command. Service command engineer personnel will also help organize individual training courses at posts, camps, and stations.

c. By Post Fire Department Personnel. A continuous fire-prevention and protection training program will be established for fire department personnel at each post. Auxiliary fire personnel and other post personnel will be trained as needed.

5.54. Inspections

a. By Chief of Engineers. OCE fire-prevention personnel will inspect representative service command installations often enough to determine the adequacy of the service command program.

b. By Service Command Engineers. Service command fire department instructor-inspectors and fire-truck and equipment inspectors will inspect all major installations including class III installations quarterly, and all less important installations semiannually. Special installations will be inspected oftener, at intervals set by the commanding general of the service command.

c. By Post Fire Department Personnel. A continuous program of fire prevention and maintenance inspection of all buildings, processes, and fire equipment will be established at each post and will be carried out primarily by post fire department personnel. Its purpose will be:

(1) Control and abatement of fire hazards.

(2) Development of familiarity with buildings, processes, abnormal hazards, and other local conditions.

(3) Check-up of condition of fire equipment to keep it ready for instant use.

5.55. Fire-loss Records

a. By Chief of Engineers. The Chief of Engineers will receive reports of fire damage submitted by all posts, camps, and stations in accordance with applicable regulations; will review and analyze fire causes and distribute information and statistics covering fire-loss experience of the War Department; and will submit to higher authority an annual report of fire-loss experience together with any necessary reports.

b. By Service Command Engineers. Service command engineers will review and record the fire-loss experience within their respective service commands, including class III installations; will initiate necessary corrective action indicated by fire-loss records; and will submit fire-loss reports when required.

c. By Post Fire Department Personnel. Each post will keep a complete record of fire-loss experience, prepare reports of all fire damage for submission to higher authority in accordance with pertinent regulations, and compile such fire-loss statistics as the post commander may require.

5.56. Outside Aid

a. Outside Fire Departments. Specific arrangements should be made for outside fire departments to assist post fire departments. Contracts may be made to provide such additional protection for a reasonable consideration. Arrangements for response of post fire departments to areas outside the military reservation may be made at the discretion of the post commander if the arrangements will not endanger post fire protection.

b. Forestry Fire Protection. The post engineer should arrange for the assistance of appropriate Federal or State forestry services in problems involving control of fires in brush or forested areas of posts.

c. Water-Front Protection. In areas under the water-front jurisdiction of the Coast Guard but where protection of water-front property is a function of the post fire department, the post engineer will arrange in advance for coordinating operations with the Coast Guard.

5.57. Utilities Services Assistance

The post engineer will arrange in advance for electric-, water-, and gas-utility personnel to respond to serious fires on receipt of a prearranged signal.

5.58. Inspection Criteria for Fire-fighting Equipment at AAF Installations

Fire-fighting equipment issued by the Chief of Engineers or commanding generals of service commands to AAF installations will be inspected and maintained in accordance with established procedures and instructions covering this subject.

Section IX. FIRE PROTECTION FOR SPECIAL FACILITIES

5.59. Projects Under Construction

The Fire Prevention Section, Repairs and Utilities Branch, OCE, is responsible for fire protection and fire prevention at all construction projects under jurisdiction of the Chief of Engineers. This responsibility is executed through the echelons under the Chief of Engineers, including division and district engineers. Technical fire-prevention personnel under the service command engineer will cooperate in discharging the responsibilities of division and district engineers. For construction projects located at active installations, fire-protection and fire-prevention work will be coordinated with the post fire-protection and prevention program.

5.60. Facilities Adapted for Troop Housing and Hospitalization

Facilities leased or owned by the War Department and adapted to troop housing should be thoroughly investigated by the division engineer at the time of their conversion and inspected at recurrent intervals thereafter by the service command engineer to insure that the level of fire safety conforms to War Department standards promulgated by the Chief of Engineers. Particular attention should be given to exits, conduct of fire drills, maintenance of suitable fire-alarm signals and warning devices, first-aid fire appliances, stand-pipes, fire doors, electric wiring and fixtures, heating facilities, regulation of smoking, watchman service, and general housekeeping. The degree of fire protection at such installations will depend on the type of housing or hospitalization contemplated. Safety to life is of primary importance.

5.61. Leased Storage Facilities

The War Department's fire-protection responsibilities will extend to private facilities which it leases for storage purposes. Division engineers will make certain that Army standards of fire protection are maintained in such facilities at the time of acquiring the leasehold; inspections should be conducted at suitably frequent intervals by qualified fire-inspection personnel from the service command engineer's office. Generally, these properties are located within municipal boundaries and satisfactory exterior fire protection may be afforded by municipal facilities. Occasionally, additional Government-furnished protection may be warranted.

5.62. Leased Premises Partially Occupied

The Chief of Engineers has stated the minimum safeguards necessary to protect personnel housed in partially occupied leased premises such as portions of hotels or other commercial facilities. Facilities partially occupied for these purposes should be leased by division engineers and maintained by post engineers in accordance with minimum safeguards.

5.63. Army Specialized Training Program and AAF College Training Program Schools

When facilities provided for Army Specialized Training Program schools and AAF College Training Program schools are accepted, division engineers will investigate them thoroughly for their suitability from the standpoint of fire protection. Service command engineers will direct qualified fire inspectors to make periodic inspections of these facilities to insure that Army standards of fire protection are maintained. A copy of the inspection report will be sent to the commanding officer of the installation for appropriate action. When the institution fails to take corrective action recommended by the division engineer, an information copy will be sent to the Chief of Engineers.

5.64. Prisoner of War Branch Camps

To insure that fire-prevention and fire-protective measures are adequate division engineers or service command engineers will make initial fire inspections at temporary prisoner of war branch camps leased or converted from other War Department use. Service command engineers will make recurrent fire inspections of these facilities.

5.65. Places of Public Assembly

At places of public assembly under War Department jurisdiction, inspections of the adequacy of fire-protection measures will be especially careful, with particular attention given to structural features and means of exit. Similar inspections should be made of public places which are not under War Department jurisdiction but are on or near Army posts if they are used frequently by large numbers of military personnel. Usually, post engineer fire personnel will make these inspections and report any unsatisfactory condition to the post commander for corrective action.

5.66. Stand-by, Excess, and Surplus Installations

Maintenance of necessary fire protection at inactive and surplus installations will remain a responsibility of the commanding general of the service command, air force, or AAF command until the division engineer actually takes custody of the property for the Chief of Engineers. The division engineer will be be responsible for maintenance of fire protection at surplus installations and facilities which have been turned over to him.

Section X. COOPERATION WITH OTHER RESPONSIBLE SERVICES

5.67. Chemical Warfare Service, Ordnance Department, and Transportation Corps

Routine inspection, training, and maintenance services of fire department instructor-inspectors and fire-truck and equipment inspectors may be extended to Chemical Warfare Service, Ordnance Department, and Transportation Corps installations at which the commanding general of the service command is not responsible for fire protection. (See pars. 5.6 and 5.7.) These services will be extended on request by the Chiefs of Chemical Warfare Service, Ordnance Department, or the Transportation Corps or by post commanders.

5.68. Manufacturing Plants

a. RESPONSIBILITY OF OPERATING SERVICE. The following fire-protection and fire-prevention activities at industrial sections of Government-owned and operated Chemical Warfare Service and Ordnance Department armories, arsenals, and proving grounds (par. 1.9) are the responsibility of the operating service:

(1) Inspection.
(2) Management of fire department.
(3) Maintenance of mobile fire equipment.
(4) Forest-fire protection.
(5) Maintenance of sprinkler systems.
(6) Maintenance of alarm systems.

b. EQUIPMENT. Initial and replacement fire equipment will be furnished by the Corps of Engineers without reimbursement in accordance with established allowances. Maintenance and operating supplies other than major replacement items such as motors, transmissions, fire pumps, etc., will be purchased locally by the responsible operating service. Major replacement items will be stocked and furnished without reimbursement, in accordance with authorized allowances, by the Corps of Engineers.

c. TECHNICAL PERSONNEL. On request, the services of qualified technical fire-prevention personnel will be furnished by the Chief of Engineers and by the commanding generals of service commands.

5.69. Charging Fire Extinguishers

Post engineer equipment and facilities for recharging fire extinguishers will be extended to other services in emergencies without reimbursement if they can accomplish recharging more readily than can the using services. If possible, post engineers will meet the requirements of the using service when recharging fire extinguishers for other services.

READING LIST

Boundaries, Surveying of—Chapter II, Part VI, OCE Engineering Manual (available through Corps of Engineers channels).

College Training Program Schools, equipment for—AGO letter, 1 December 1943, Supply of Standard Items of Issue and Excess and Surplus Construction Property to Schools of the Army Air Forces College Training Program and Army Specialized Training Schools of the Army Service Forces, and Periodic Inspection of Such Facilities.

Concrete—OCE letter to all service commands, Instructions for Placing Concrete Finish Floor Over Wood-joist Construction, 21 December 1943, file SPEUM. OCE letter to all service commands, Reconditioning Concrete Warehouse Floors, 17 August 1944, file SPEUM. (Available from service command engineers).

Funds, estimates for—War Department Circular 154, 1943; War Department Circular 329, 1944.

Inactive Installations, maintenance of—TB ENG. 66.

Insulation—OCE letter to all service commands, Correction of Insulation Deficiencies: Northern Climate Cantonment Buildings, 3 September 1943, file SPEUM (available from service command engineers).

Janitorial Supplies, allowances for—OQMG Circular 4, 1945 (available through QMC Channels).

Leases—AR 100-61.

Navy Department, transfer of supplies to—ASF Circular 204, 1944.

Nonappropriated funds, priorities for—War Department Circular 459, 1944; War Department Circular 25, 1945; and AGO Memo. W210-17-43, 24 July 1943.

Petroleum products, funds for—SB 10-182.

Permits—Chapter XI, OCE Real Estate Manual. (Available through Corps of Engineers channels).

Plywood, purchase of—OCE letter to all service commands, Purchase of Plywood for Repairs and Utilities Projects, 4 January 1945, file SPEUM. (Available from service command engineers).

Priorities, nonappropriated funds—War Department Circular 459, 1944; and War Department Circular 25, 1945.

Purchasing and Contracting—War Department Circular 310, 1944.

Recreational Building Allowances—AGO Memo. W210-18-42, Recreation Building Construction, 1 December 1942.

Roof Repairs—OCE letter to all service commands, Data for Inclusion in the Revised Repairs and Utilities Manual, Section 0602.04, 27 April 1943, file SPEUM; OCE letter to all service commands, Roof Coating, 10 July 1944, file SPEUM (available from service command engineers).

Screens—OCE letter to all service commands, Maintenance of Screen Cloth, 8 July 1944, file SPEUM. (Available from service command engineers).

Surplus installations, transfer and disposition—War Department Circular 8, 1944; War Department Circular 89, 1945; and War Department Circular 195, 1945.

Surplus installations, maintenance of—TB ENG 66.

Unserviceable property, disposal of—War Department Circular 7, 1944; War Department Circular 90, 1944; and War Department Circular 239, 1944.

Vehicles, supply of—War Department Circular 139, 1945.

Vehicles, use for transportation of personnel—War Department Circular 397, 1944.

Veterans Administration, transfer of supplies to—ASF Circular 285, 1944.

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